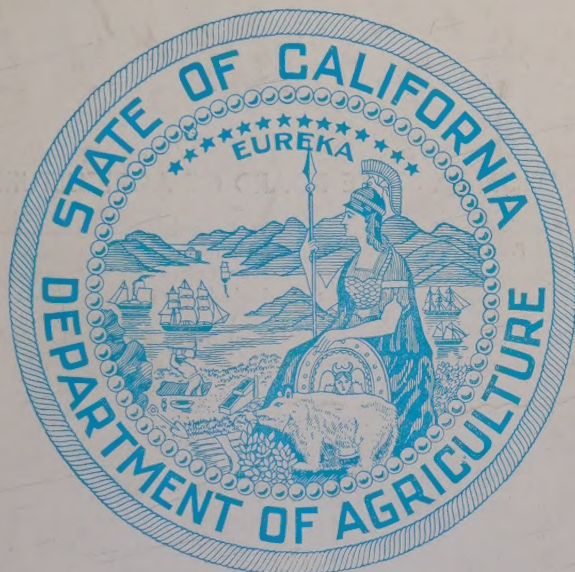


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NUMBER 4

STATE OF CALIFORNIA
DEPARTMENT OF AGRICULTURE



THIRTY-FIFTH
ANNUAL REPORT

PERIOD ENDING DECEMBER 31, 1954

SACRAMENTO, CALIFORNIA

OCTOBER

NOVEMBER

DECEMBER

1954



STATE OF CALIFORNIA
GOODWIN J. KNIGHT, Governor
HAROLD J. POWERS, Lieutenant Governor

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Volume XLIII

Number 4

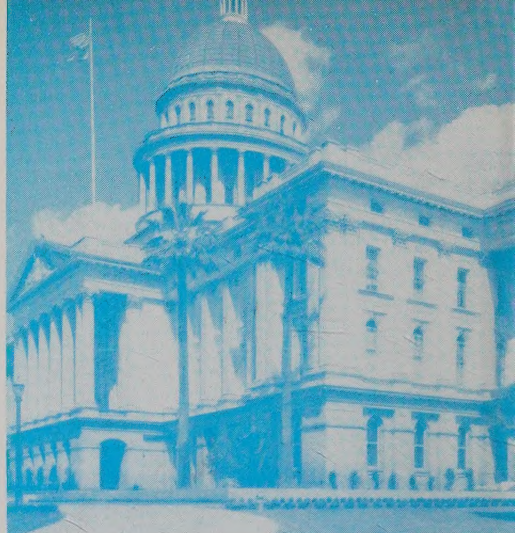
Official Journal of the Department of Agriculture, State of California

W. C. JACOBSEN, *Director*

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CLIFFORD CLOWER, *Photographer*



California State Capitol

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ANSON ALVIN BROCK

As we occupy our new and beautiful offices and thus gather under one roof, so to speak, our official family, we recognize the accomplishment of hopes and visions of a decade or more. In this realization, we remember and gratefully acknowledge the tireless efforts of former Director A. A. Brock to aid in achieving this objective.

The *Quarterly Bulletin*, published as a contribution to the welfare of California Agriculture, is mailed free to California citizens interested in the work of the Department of Agriculture. The *Bulletin* is exchanged, on request, for publications of the Federal Government, Experiment Stations, and other state or national agricultural offices or organizations.

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THE HONORABLE GOODWIN J. KNIGHT, Governor of California.

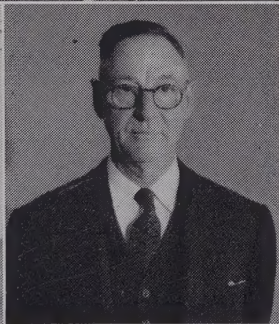
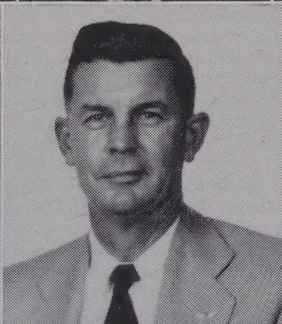
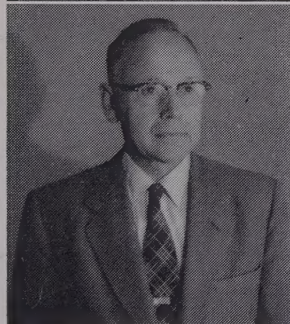
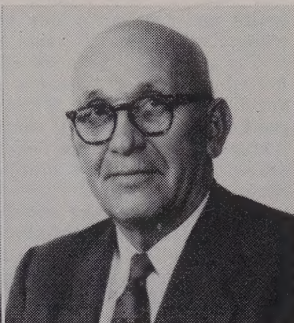
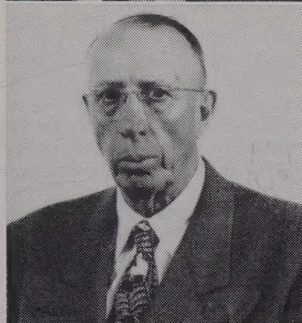
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STATE BOARD OF AGRICULTURE



Top left: A. J. McFadden, President, State Board of Agriculture, Santa Ana, Orange County, representing Subtropical Horticulture; *top row, l. to r.:* Frank M. Shay, San Jose, Santa Clara County, representing Prunes and Apricots; Louis A. Rozzoni, Clements, San Joaquin County, representing Field Crops and Vegetables; W. L. Smith, Buttonwillow, Kern County, representing Cotton and Potatoes; *middle row, l. to r.:* Dr. Harry R. Wellman, University of California, Berkeley, Alameda County, representing Agricultural Economics; John V. Newman, Ventura, Ventura County, representing Citrus Fruits; Donald C. Bull, Marysville, Yuba County, representing Canning Fruits; *bottom row, l. to r.:* Milton M. Reiman, Planada, Merced County, representing Dairy and Poultry Farming; James E. Armstrong, Los Angeles, Los Angeles County, representing Livestock; Romain Young, Sacramento, Sacramento County, Assistant Secretary, State Board of Agriculture.



REPORT OF THE DIRECTOR

By W. C. JACOBSEN *

This report for 1954 is designed to inform the public, and particularly those engaged in agriculture, of the regulatory and service functions of the State Department of Agriculture. In addition, the report will briefly describe the activities of the Department during that year.

Indications confirm the belief that the volume of crop production in 1954 hit a near-record level, and that the over-all receipts from farm marketings, including livestock and livestock products, although slightly less than in 1953, again approached the two and one-half billion dollar mark. Early estimates indicate that California again in 1954 maintained its lead over all other states in cash income from sales of farm commodities with a preliminary total of \$2,500,000,000. This development will mean that California has ranked first in farm income in 20 of the past 25 years; furthermore, in each of the past nine years, the farm income has exceeded two billions of dollars. Considering the combined national total of fruits and tree nuts, our production was about 43 percent of the national total, while the commercial vegetable crop made up 29 percent.

The combined tonnage of crops has steadily increased, and the volume is reflected in greater tonnages of field crops rather than in an increase in fruit and vegetable production. While fruit and vegetables together still comprise the dominant component of the State's agriculture, current trends are manifested by the increased annual output of hay and grain, and in the added irrigated pastures required to support the continued expansion of production of milk, poultry, eggs and beef.

Returns to growers per ton for all California field crops combined, including potatoes and sweet potatoes, averaged six percent below 1953, reflecting the record high production and lower support prices. Corn, wheat, cotton, potatoes, and most field seeds were exceptions. Other crops, quite uniformly, were only moderately below 1953. Prices for commercial vegetables, excluding potatoes and sweet potatoes, averaged virtually the same in the two years. Nearly half the items averaged above 1953, and slightly over half below.

With few exceptions, changes from 1953 were small. Prices for fruits and nuts were contrary to the general trend, averaging four percent above 1953 and the highest since 1950. Citrus fruits in particular averaged higher. Grapes and deciduous tree fruits were somewhat higher, but nuts and semitropical tree fruits lower. Prices for livestock and livestock products averaged below 1953, largely because of lower prices for eggs, poultry, turkeys and milk. Prices averaged above 1953 for sheep, hogs and beef cattle.

Section 30 of the Agricultural Code provides that, "The department shall promote and protect the agricultural industry of the State * * *." Over the years this mandate has meant that in addition to preventing introduction and spread of seriously injurious pests and diseases of crops and livestock, the department is charged with the duty of rendering aid in the marketing of our production.

PROTECTIVE FUNCTIONS

Note should be made of several particular projects directed to the protective phase of the function:

VESICULAR EXANTHEMA

Vesicular exanthema, a disease of hogs, finally appears to be in line for very appreciable reduction, if not virtual eradication. While this disease has been of long standing, only a major upset to the swine industry of the nation brought support to the projected program of the Department to the effect that mandatory cooking of raw garbage for hog feeding would provide the best solution. Such a program was effective in other states, and the findings of research scientists of the College of Agriculture at Davis supported this contention. When efforts at legislation again

* Appointed by Governor Goodwin J. Knight to serve as Director of Agriculture following the retirement of A. A. Brock, effective February 1, 1954.

failed in 1953, the Attorney General advised that the exercise of animal quarantine enforcement principles could be applied in the control of this disease. Study indicated that this activity would be effective in making a further gain towards the reduction of the disease, especially in those areas where raw garbage feeding was limited, or where other types of feed not capable of harboring the disease were used.

To this end 21 counties in Northern California were utilized as a basis for determining the feasibility of this quarantine approach. The advantages of prevention of swine movement from premises continuing to feed raw garbage became apparent, and with the gradual cessation of raw garbage feeding, a number of counties became free from the disease. Applicable federal and state restrictions were then removed. This development led to a demand that the other 37 counties of the State be accorded the benefits of a comparable regulatory process. After hearings were held, the quarantine program was made effective through regulation.

The gratifying result was that at the end of the year only 35 premises out of 533 remained under ranch quarantine. With this type of cooperation between state and federal agricultural regulatory officials on the one hand, and the swine producers on the other, the value of cooking of raw garbage became so clearly apparent that it is believed that the 1955 Legislature will enact adequate provision to safeguard the gains made, and to authorize inspection work to keep in effect mandatory processing of raw garbage.

MEXICAN FRUIT FLY

The manifest hazard to the State's citrus, subtropical and deciduous fruit culture from Mexican fruit fly (*Anastrepha ludens*) became apparent with discovery of the pest, in January, in traps serviced by the Federal Government in Tijuana Valley within a few miles of the International Border. Fortunately, the Crops Regulatory Programs office of the Agricultural Research Service had developed exceedingly effective cooperative relationships with Mexican authorities, so that survey and treatment operations could be undertaken in that country. Trapping on both sides of the boundary was immediately intensified, in order to insure discovery of any spread from the original infestation or from any other source. Plans were perfected to cope with any potential development; it was recognized that this problem should be undertaken as a joint enterprise involving the counties, the Federal Government, the Department, the University research staff and the fruit industry—only through such coordinated effort could the introduction and spread of this possibly most destructive of the fruit flies be stemmed.

Additional collections of adult flies, between January 22 and November 23, indicated a continuing threat to the State. One of these was trapped in the town of San Ysidro in San Diego County. Necessary quarantine action was taken immediately, and the establishment of an eradication area was developed. It was clear that if adult flies were sourced in fruit either from market centers across the border in Mexico, or in host fruit growing in Tijuana Valley, the best protective device would be to lay down a barrier of poisonous sprays on host plants which might be visited by any flying adults. Intensification of border quarantine inspection was indicated because of the volume of infested mangoes found on local Tijuana markets, evidently smuggled in from the mainland of Mexico. Comparable infestations found at Ensenada and Mexicali supported the smuggling theory.

Most responsive assistance was forthcoming from San Diego and Imperial Counties. Other Southern California counties cooperated with trapping programs. The citrus, avocado and vegetable industries responded through furnishing fumigation equipment, for which public funds were not available, to be used in treating infested fruits at designated points through which they could be channeled. This action allowed the movement of a desirable consumer product, protected against carrying infestation, and in avoidance of attempted smuggling. Mexican officers, acting in harmony with our own federal authorities, collaborated fully to prevent further introduction and spread, which, unless coped with across the international boundary, would serve as a continuing menace.

The question of whether sufficient funds had been allocated to the Federal Agricultural Research Service became most important in the problem, not only as regards administration of adequate quarantine procedures, but also for intensification of research vitally needed in these fields: improving insecticides, developing more specific lures, making climatological cabinet analyses, and determining suitable host fruit treatments, as well as advancing biological knowledge in the light of the new set of surrounding host and climate conditions which differed from those for which any previous research program had been undertaken.

KHAPRA BEETLE

This seriously injurious storage insect was briefly mentioned in our last report, because only shortly before its issuance the Khapra beetle (*Trogoderma granarium*) was identified as clearly distinctive from other insects which might affect stored products. It became necessary, on short notice, to apply the criteria then available to determine whether an eradication attempt should be made, or whether the pest was of such a nature that the affected segments of the agricultural industry would be obliged to live with it, and to rely upon treatments to prevent expansive development and spread. After it was determined that the Khapra beetle did not attack growing crops, did not spread by natural flight, was spread by human assistance, was restricted in distribution and was exceedingly destructive, the decision was made to attempt eradication of the pest. Such a program was approved by federal authorities, by legislators on the Joint Interim Committee on Agriculture and Livestock Problems, by the Department of Finance and by the Legislative Auditor.

Since ordinary control practices, including conventional fumigation against storage insects, were ineffective to destroy the larvae, which are capable of hiding in minute building crevices, in infested commodities and their containers, it was apparent that we must develop an unorthodox procedure, whereby the entire infested buildings would be placed under gas-tight covers and an extra heavy dosage of fumigant then applied. Test treatments must be made under the great variety of circumstances being encountered in the field; whether the goal of eradication can be achieved must await experience with knowledges and techniques. Fortunately both federal and state research authorities recognize the importance of intensive investigation to aid in the development of improved suppressive methods. Since revolutionary treatment processes are indicated, these, if perfected, could lead to impressive results in correcting long-standing sanitation difficulties brought about by insect infestations in stored agricultural and food products.

YELLOW CLOVER APHID

If the experience in Arizona with the yellow clover aphid (*Myzocallis trifolii*) can be utilized as a criterion, it appears that alfalfa producers in California will be subjected to a new kind of destructive pest presenting serious control problems. Losses to alfalfa plantings under the climatic conditions surrounding our neighboring state can undoubtedly be duplicated here. We mention this pest only in passing because of the potential indicated and possible complications in destroying beneficial insects, including the possible effect upon pollinating insects important to seed production, with the severe type of spray materials necessary.

QUARANTINE INSPECTION

Since quarantine inspection represents the preventive or prophylactic phase of pest control, it appears desirable occasionally to review the value of maintaining adequate inspection facilities. During the year cattle scab was found on animals from states not recorded as infested. This development necessitated quarantine action to prevent further introductions. Under such circumstances, the receiving state must be prepared to give necessary treatments and to establish inspection machinery to prevent further spread from unforeseen introductions.

Results tabulated from border quarantine inspections in the plant field also reveal some pertinent facts. There has been a constant increase in volume of vehicles through the 17 inspection stations maintained, and pest interceptions continue apace: during 1954 nearly 4,000,000 vehicles were checked, involving 10,000,000 passengers.

The question often arises as to the protective value of plant quarantine inspection in the light of public expense required to maintain it. California lists cotton among its most important basic crops. While there was a slight decline in acreage in 1953, and a cut to 900,000 acres in 1954 from a high of 1,400,000 acres in 1952, there nevertheless was a farm value of \$312,430,000 attached to California cotton production for 1953. The two major pests of cotton still remain the cotton boll weevil and the pink bollworm; the United States Department of Agriculture has indicated that the loss to the cotton crop by boll weevil alone to be 10.4 percent of the national crop. Applying this percentage to the value of the California crop, we find that the loss from this pest alone could be approximately \$32,000,000. This amount does not include the costs of control to prevent greater loss.

Analyzing the costs of maintaining the border quarantine inspection work, we find approximate expenditures (including the current fiscal year) since its inception in 1921, to be slightly less than \$8,000,000. Even adding the capital outlay expenditures for supplying facilities at the inspection stations, our total border plant quar-

antime cost would not greatly exceed \$10,000,000. A comparison readily indicates that the percentage of loss to the cotton crop alone for one year from a single pest would pay several times for the maintenance of the border quarantine inspection service since its beginning.

Our maritime port inspection continues to intercept serious foreign pests, including numerous fruit flies and their hosts. The interior quarantine inspections conducted mainly by the county agricultural commissioners at freight, express and mail terminals, reveal interceptions of many important pests, such as Southwestern and European corn borers, citrus white fly, Khapra beetle, apple maggot, cotton boll weevil, sweet potato weevil, plum curculio, burrowing nematode, and other equally dangerous threats to California's agriculture.

INTERGOVERNMENTAL RELATIONS IN PEST PROGRAMS

Because of the seeming partial disavowal of a federal responsibility in the field of exercising an adequate protective function, such as the states for many years believed to be inherent in the United States Department of Agriculture, attempts were made by the 1954 Legislature, state and county official agricultural regulatory agency representatives, farm organizations and industry groups to rekindle the recognition of the importance of necessary federal assistance in preventing the introduction into, and spread within, this country of seriously injurious insect pests and diseases affecting the welfare of our plant and animal production. The resistance to sizable budget curtailments recommended by the federal department in these fields had to be brought to the attention of the Congress, where well-informed and sympathetic members voted for restorations sufficient to carry on the work at as near the established levels as possible.

It was obvious that foreign plant and animal quarantine enforcement could become virtually ineffective through reduced personnel, or where serious pest outbreaks occurred, or where limited infestations appeared. It was plain that states were powerless to aid in protecting themselves, regardless of their willingness, unless there was a sound federal enforcement program to prevent introduction in the first instance, or the exercise of leadership and coordinated cooperation by a federal agency in stamping out incipient infestations.

Several associations representing official agencies and congressional subcommittees working on the 1955 and 1956 appropriation bills for the United States Department of Agriculture recommended that a long-range pest program policy be worked out, so that a better understanding of state and/or federal spheres of action could be developed. If such a procedure were not followed, then many of the valuable gains against pests would be lost; the states could not be geared to assuming their proper share of the burden—great economic inconvenience and expense would devolve upon producers and others from the inroads of pests and disease.

Regardless of how valuable research may be in ultimately finding the answers to control or suppression problems, significant aid comes from the exercise of known techniques, and from the utilization of interstate regulations to restrict or modify the spread of pests pending research results.

Fortunately, support is developing toward the formulation of an intelligible policy designed to point up the needs, and to indicate the areas of coordinated protective actions in the field of suppressing and preventing the introduction and spread of pests and diseases.

PROMOTIONAL FUNCTIONS

The **promotion** phases of our departmental activity appear primarily within functions allocated to the Division of Marketing. California has received considerable acclaim for the judicious use of marketing orders, agreements and programs under the authority of the several marketing laws. Because of the nature of our specialty crops, these programs lend themselves to a self-help type of activity, taking them outside the category of those involving price support programs.

During the past several years there has been an average of approximately 30 such programs, and there are constant requests for information as to the adaptability of other crops and production to use of this type of orderly marketing procedures. Requests have recently come from representatives of industries producing or handling strawberries, lambs, fryers, apricots and other important crops. Current orders involve 3,600 processors and 36,000 producers, representing an annual crop value of \$317,000,000. The joint programs undertaken for a study of market outlets under the Research and Marketing Act of 1946, and Sections 1285-6 of the Agricultural Code, have aided materially in indicating the need for advertising and trade promo-

tion, research, as well as grade and size features, which are important among the provisions included in marketing programs.

Worthy of note is the important expansion of strawberry production reported by Agricultural Statistics in anticipation of a possible marketing order for this crop. Over the last six years the acreage has increased two and one-half times, whereas the production from that acreage has increased three and one-half times. Improvement of varieties, together with a program of growing stock certification and development of pest treatments, has aided materially to increase the production of a good quality crop for shipping, freezing and other processing.

MILK CONTROL LAW

Court actions were filed by a grocery chain, presumably to challenge the validity of the Department's action in establishing minimum wholesale and retail resale prices for fluid milk, and to test the constitutionality of that portion of the law which directs the Department to assume that activity and responsibility. Of the several suits filed, the one brought in the Superior Court of Kings County is the one pursued most actively, but at the end of the year the conclusion of the trial was not in sight.

We believe it to be the Department's responsibility vigorously to defend against attacks upon the law and its administration, with the able assistance of the Attorney General as our counsel. It is our conception that the legislative directives must be complied with to the extent to which personnel and finances permit. During the year there have been many discussions with producer groups and committees, and to some extent with distributor groups, for the purpose of gaining a better understanding of these features which have engendered controversy. The policy of directing the administration of the Milk Control Law in keeping with an understanding of legislative intent, court decisions, and the advice of the Attorney General keeps departmental personnel from venturing opinions which might show agreement or disagreement with any of the many viewpoints expressed.

At the beginning of the year there was considerable argument from producers who sought a variation in administration which would result in a modified interpretation of the several standards in the law affecting establishment of prices to be paid producers by receivers of fluid milk. This development led to the selection of a committee representing producers from all areas of the State, and a presentation of their views, first to the Department and then to the State Board of Agriculture. Emphasis continued to be directed to re-evaluating the basic standards which guide producer pricing, particularly production costs. There was general accord for the separate pricing of skim and fat in the deliveries to distributors, and in developing corrective legislation to prevent inequities resulting from the intermarket transfers of these products.

At the close of the year it appeared that numerous proposals involving the Milk Control Law would be presented to the 1955 Legislature for its consideration.

Action against certain distributors was contemplated to correct a type of financing operations determined to be in violation of the Milk Control Law. Preliminary consideration indicates that administrative hearings may bring about necessary adjustments. In December a very valuable document on "Fluid Milk Price Control in California," compiled at the request of the Joint Interim Committee on Agriculture and Livestock Problems, was distributed by the Giannini Foundation of the University of California.

This document gave strength to the belief that the Joint Interim Committee would undertake a fairly complete study of the Milk Control Law and its administration, and that legislation designed to adjust certain features in the Milk Control Law would probably be enacted.

DEPARTMENT OF AGRICULTURE BUILDINGS

Facilities to house all of the Sacramento offices and laboratories of the Department, except the poultry and animal disease diagnostic service, have been provided by the Department of Finance at 1220 N Street, in quarters previously occupied by the Department of Motor Vehicles, and in a new building, associated therewith, at 1215 O Street, Sacramento.

The new structure is being financed out of reserves accumulated in the Department of Agriculture Fund over a period of 24 years. These two four-story buildings are of reinforced concrete, and are connected at the second, third and fourth floors by a bridge spanning the service street which bisects the block.

Department administrative offices are located on the first floor of the N Street Building, and the three remaining divisions are on each of the upper floors: Marketing on the second, Plant Industry on the third and Animal Industry on the fourth. The O Street Building will house the Bureaus of Weights and Measures, Field Crops, Fruit and Vegetable Standardization, Shipping Point Inspection and Chemistry, together with attendant laboratories.

Certain currently unrequired space areas have been made available to other state agencies: the Department of Finance's Lands, and Fairs and Expositions divisions occupy a corner of the N Street Building; the O Street Building will have space available on a rental basis for the State Reclamation Board and for the new Department of Alcoholic Beverage Control.

Estimated cost of renovating the old Motor Vehicles Building totals \$561,800, accomplished largely by informal contracts or direct construction by the Division of Architecture field forces. Estimated construction cost for the new building under contracts is \$2,187,000.

The Sacramento poultry and animal disease diagnostic laboratory will be established at a separate location, several miles south of the headquarters offices, as soon as final plans can be approved.

This complete housing at Sacramento represents the culmination of 15 years of persistent and tedious effort, and was made possible only by cooperation of the Legislature in authorizing use of reserve funds for the new construction, and of the Director of Finance in arranging for occupancy of the quarters vacated by the Department of Motor Vehicles last year.

Highway relocations near Fort Yuma and Blythe will require new border quarantine stations, which upon completion will largely meet the needs for this type of facility for several years to come.

Permanent personnel for the Department numbered about 1,300. Seasonal augmentation, exempt and trust fund employees reached a maximum at any one time of the year of about 1,750 persons.

COOPERATION

The foregoing comments emphasize certain features appearing significant during the year. The Department activities could not have attained an approach to beneficial results and to constructive goals, without the complete cooperation of many organizations and agencies. Historically and traditionally, governmental policies for agriculture in California assign enforcement and administration of many valuable laws to the county level, particularly involving the assistance of county agricultural commissioners, county sealers of weights and measures, county livestock inspectors, and in certain areas the local public health officers. For their assistance, we are truly appreciative. Likewise, excellent cooperative relations have been maintained with the College of Agriculture, farm organizations, the Federal Government, industry groups, other state departments, and particularly valuable assistance has been received from the California State Board of Agriculture.

As we review the year's work recorded in this report, it is gratifying to see and to acknowledge the manner in which the Department's staff and all personnel have worked as a team toward the common goal—service to agriculture.

DEPARTMENTAL PERSONNEL OFFICE

CHARLES P. CUSICK, *Personnel Officer*

The Personnel Office administers the personnel program for the Department of Agriculture and maintains a roster of employees for pay roll purposes, leave and retirement. Of 217 California civil service job classifications used by this Department, 164 are limited to Department of Agriculture functions.

The Personnel Office conducts job classifications studies and salary surveys, investigates cases requiring disciplinary action, assists bureaus with their training programs and maintains training records.

In cooperation with and for California counties, the Personnel Office examines applicants and certifies those found to be eligible for appointment by respective county boards of supervisors to positions as county agricultural commissioners, deputy agricultural commissioners, county sealers of weights and measures, deputy sealers of weights and measures, county agricultural inspectors and seasonal agricultural inspectors.

SPECIAL FUNCTIONS

RECRUITMENT

Recruiting is a continuous activity of this office. Bureaus frequently request during the entire year seasonal employees for short term projects throughout California. The canning tomato inspection program, for example, begins in July and ends in November or December; it requires over three hundred inspectors as well as the necessary clerical personnel. During the same period Bureaus of Shipping Point Inspection, Fruit and Vegetable Standardization, Field Crops, Entomology, Plant Quarantine, Agricultural Statistics and Plant Pathology also use seasonal employees for varying lengths of time. In addition to those 1,298 employees filling permanent Department positions during 1954, 1609 persons were employed on a seasonal basis.

EXAMINING

The following is a resume of examinations held by this Department, during 1954, to qualify persons for employment in county agricultural departments and county departments of weights and measures:

<i>Title of Examination</i>	<i>Number of candidates</i>	<i>Successful</i>	<i>Unsuccessful</i>
County Agricultural Commissioner)			
Deputy Agricultural Commissioner) -----	119	53	66
County Sealer of Weights and Measures)			
Deputy Sealer of Weights and Measures) -----	55	36	19
County Agricultural Inspector -----	522	201	321
Seasonal County Agricultural Inspector -----	31	22	9
	—	—	—
Total -----	727	312	415

IN-SERVICE TRAINING

In the latter part of 1953 the Director of Agriculture appointed an In-Service Training Advisory Committee. One of its first recommendations was that each bureau chief appoint a training coordinator. Two staff members of the State Personnel Board Training Division and members of this staff conducted a "Train the Trainer Program," designed to prepare bureau coordinators to train supervisors in their bureaus. The Personnel Office, working with bureau training coordinators and the State Training Office, participated in planning, arranging and conducting department-wide and bureau training programs as follows:

	<i>Trainees</i>	<i>Trainee hours</i>
Management training for division and bureau chiefs -----	19	275
Training coordinators workshops -----	18	1080
Training for enforcement officers (Sacramento and Fresno) -----	118	466
Job instruction training -----	31	310

During the past year Personnel Office staff members assisted seven bureaus to plan and conduct supervisory training courses. The Personnel Office also participated in planning a public relations course to be given to department employees during 1955.

Other major training activities during the past year included: compilation of a list of training books and publications; preparation of the Department Employee Opinion Survey, released in April; preparation and distribution of employee and management summaries of opinion survey results.

In February and March Personnel Office staff members held training conferences throughout California to assist supervisors in preparation and use of reports of performance.

FINANCIAL STATEMENT **EXPENDITURES FOR THE FISCAL YEAR** **July 1, 1953-June 30, 1954**

C. H. PERKINS, Fiscal Officer

GENERAL FUND FUNCTIONS	Detail	Subtotals	Totals
ADMINISTRATION.....			\$403,220.33
DIVISION OF PLANT INDUSTRY.....			2,325,633.91
Administration.....		\$15,524.56	
Bureau of Entomology.....		682,130.63	
General Entomology.....	\$215,056.17		
Destruction and Control of Beet Leaf Hoppers and Host Plants.....	257,922.23		
Grape Leaf Skeletonizer Eradication.....	96,568.66		
Mexican Bean Beetle Suppression.....	28,764.25		
Hall's Scale Eradication.....	66,214.99		
Cherry Fruit Fly Eradication.....	17,604.33		
Bureau of Plant Quarantine.....		1,033,532.79	
Bureau of Plant Pathology.....		149,440.87	
Plant Pathology.....	123,051.58		
Quick Decline of Citrus.....	26,389.29		
Bureau of Rodent and Weed Control and Seed Inspection.....		400,460.86	
Rodent and Weed Control.....	114,502.00		
Seed Inspection.....	91,088.18		
Predatory Animal Control.....	194,870.68		
Bureau of Chemistry.....			
Spray Residue Enforcement.....		44,544.20	
DIVISION OF ANIMAL INDUSTRY.....			2,090,941.80
Administration.....		15,361.85	
Bureau of Livestock Disease Control.....		1,187,125.50	
Livestock Disease Control.....	1,020,684.94		
Animal Pathological Laboratory—San Gabriel.....	50,626.56		
Poultry Pathological Laboratory—Petaluma.....	45,508.53		
Poultry Pathological Laboratory—Turlock.....	26,378.69		
Animal Pathological Laboratory—Fresno.....	43,926.78		
Bureau of Dairy Service.....		143,600.29	
Bureau of Meat Inspection.....		744,854.16	
Meat Supervision.....	97,697.87		
Meat Inspection.....	647,156.29		
DIVISION OF MARKETING.....			1,038,950.30
Administration.....		11,344.18	
Bureau of Markets.....		231,548.59	
General Marketing Service.....	231,548.59		
Bureau of Market News.....		397,454.69	
Supervisory and Field.....	242,287.74		
Fruit and Vegetable Reporting.....	78,399.00		
Hay and Grain Reporting.....	34,300.96		
Livestock, Meat and Wool Reporting.....	19,927.46		
Dairy and Poultry Products Reporting.....	22,539.53		
Bureau of Agricultural Statistics.....		52,548.40	
Bureau of Fruit and Vegetable Standardization.....		249,919.23	
Fruit and Vegetable Standardization.....	202,584.87		
Seed Potato Certification.....	47,334.36		
Bureau of Weights and Measures.....		96,135.21	
Subtotal—Support.....			\$5,858,746.34

EXPENDITURES FOR THE FISCAL YEAR—Continued

July 1, 1953-June 30, 1954

GENERAL FUND FUNCTIONS	Detail	Subtotals	Totals
LESS ESTIMATED REIMBURSEMENTS.....			\$558,884.98
Bureau of Markets.....	\$194,760.49		
Bureau of Meat Inspection.....	37,772.22		
Bureau of Plant Quarantine.....	3,718.76		
Office—Central Supplies.....	44,494.03		
Departmental Administration.....	190,979.00		
Office Service Unit.....	2,790.15		
Bureau of Rodent and Weed Control and Seed Inspection.....	29,096.52		
Livestock Disease Control—Pullorum and Paratyphoid Testing Service.....	41,666.40		
Bureau of Market News.....	8,812.00		
Bureau of Plant Pathology.....	4,795.41		
Total—Support.....			\$5,299,861.36
OTHER CURRENT EXPENSES.....			\$205,194.12
Federal Cooperative Marketing Research.....	\$52,403.29		
Salaries of County Agricultural Commissioners.....	130,374.04		
Moving Expense Ch. 971/53, Item 42.....	2,339.06		
Raisin Survey Ch. 971/53, E.O. E53-297.....	3,508.96		
Raisin Survey Ch. 1712/53.....	5,921.31		
South San Francisco Livestock Market News, Ch. 1520/53.....	10,647.46		
Total—General Fund Functions.....			\$5,505,055.48*

* Includes Accounts Payable of \$136,955.03 and Accounts Receivable of \$1,633.94.

CAPITAL OUTLAY AND SAVINGS FUND	Detail	Subtotals	Totals
CAPITAL OUTLAY			
Major Construction, Improvements and Equipment.....			\$—42,586.58
Fruit and Vegetable Standardization.....		\$8,810.00	
Banning-Beaumont.....	\$8,810.00		
Plant Quarantine Service.....		—45,265.09	
Fort Yuma.....	650.00		
Tulelake.....	—18,145.75		
Peavine.....	—12,519.82		
Coleville.....	8,129.42		
Benton.....	747.53		
Yermo.....	—23,470.30		
Truckee Wye.....	—488.51		
Meyers.....	—190.74		
Peavine-Hornbrook.....	23.08		
Livestock Disease Control.....		—6,131.49	
Fresno.....	153.36		
Petaluma.....	—6,284.85		
Minor Construction, Repairs and Equipment.....			4,688.64
Livestock Disease Control.....		8,327.12	
Fresno.....	6,704.29		
District Office.....	513.07		
Petaluma.....	1,109.76		
Fruit and Vegetable Standardization.....		—3,638.48	
Pacheco Pass.....	—3,638.48		
Total—Capital Outlay and Savings Fund.....			*\$—37,897.94

* Includes Expenditures for Capital Outlay, \$27,921.30, and Returns of Unexpended Balances, —\$65,819.24.

DEPARTMENT OF AGRICULTURE FUND FUNCTIONS	Detail	Subtotals	Totals
DIVISION OF PLANT INDUSTRY			\$846,900.24
Bureau of Plant Quarantine		\$96,785.76	
Nursery Service	\$96,785.76		
Bureau of Field Crops		419,134.95	
Bonded Warehouse Inspection	55.97		
Field Crops Inspection	210,484.75		
Grain Warehouse Inspection	3,303.52		
Terminal Weighing Services	1,129.60		
Commercial Feeding Stuffs Service	204,161.11		
Bureau of Chemistry		295,568.38	
Chemistry†	274,312.98		
Agricultural Pest Control Operators	21,255.40		
Bureau of Rodent and Weed Control and Seed Inspection		35,411.15	
Seed Testing and Certification Service	35,411.15		
DIVISION OF ANIMAL INDUSTRY			765,921.01
Bureau of Dairy Service		153,810.30	
Dairy Service	121,371.60		
Testing and Sampling of Fluid Milk	32,438.70		
Bureau of Livestock Identification		612,110.71	
DIVISION OF MARKETING			2,917,978.78
Bureau of Markets		9,102.52	
Agricultural Producers Marketing Act	7,589.34		
California Agricultural Products Marketing Act	1,513.18		
Bureau of Market Enforcement		218,569.15	
Bureau of Milk Control		689,604.52	
Bureau of Fruit and Vegetable Standardization		371,952.99	
Canning Tomato Inspection	370,486.39		
Winter Seed Potato Test Plot	1,466.60		
Bureau of Shipping Point Inspection		1,480,982.93	
Bureau of Weights and Measures		147,796.67	
Gasoline, Distillate and Oil Inspection and Antifreeze Registration	147,766.67		
Subtotal—Support			\$4,530,800.03
LESS ESTIMATED REIMBURSEMENTS			
Bureau of Milk Control			—6,432.60
Total—Support			\$4,524,367.43
OTHER CURRENT EXPENSES			597.40
Canning Tomato Inspection	597.40		
Total—Department of Agriculture Fund Functions			\$4,524,964.83*

* Includes Accounts Payable, \$200,464.27, and Accounts Receivable, —\$1,492.35.

† Economic Poisons, \$57,489.33; Fertilizing Materials Service, \$216,823.65.

REVENUE FOR THE FISCAL YEAR
July 1, 1953, to June 30, 1954

GENERAL FUND FUNCTIONS	Detail	Subtotals	Totals
DEPARTMENTAL ADMINISTRATION			
Miscellaneous Income.....	\$1,681.97	\$1,681.97	\$1,681.97
DIVISION OF PLANT INDUSTRY			73.50
Bureau of Entomology.....		72.00	
Apary Brand Registration Fees.....	72.00		
Bureau of Rodent and Weed Control and Seed Inspection.....		1.50	
Sale of Documents.....	1.50		
DIVISION OF ANIMAL INDUSTRY			38,309.27
Bureau of Meat Inspection		532.29	
Foreign Cold Storage Meat Inspection—Licenses.....	430.00		
Foreign Cold Storage Meat Inspection—Fees.....	102.29		
Bureau of Dairy Service		37,776.98	
Container Brand Registration Fees.....	175.00		
Miscellaneous Dairy Products Factory Licenses.....	10,055.20		
Miscellaneous Dairy Products Factory Licenses—Penalties.....	68.25		
Oleomargarine Licenses—Bakery and Restaurant.....	1,048.61		
Oleomargarine Licenses—Manufacturers.....	200.00		
Oleomargarine Licenses—Wholesale.....	4,829.13		
Imitation Milk Licenses Manufacturers.....	200.00		
Imitation Milk Licenses Retail.....	475.00		
Imitation Milk Licenses Bakery and Restaurant.....	4.00		
Imitation Milk Licenses Wholesale.....	150.00		
Imitation Cream Licenses Wholesale.....	100.00		
Imitation Cream Licenses Retail.....	70.00		
Imitation Cream Licenses Bakery and Restaurant.....	132.00		
Imitation Cream Licenses Manufacturers.....	200.00		
Imitation Ice Cream Licenses Manufacturers.....	983.34		
Imitation Ice Cream Licenses—Retail.....	8,549.23		
Imitation Ice Cream Licenses—Bakery and Restaurant.....	2.00		
Imitation Ice Cream Licenses—Wholesale.....	4,433.35		
Samplers and Weighers Licenses.....	1,895.00		
Samplers and Weighers Licenses—Penalties.....	17.00		
Pasteurizers Licenses.....	2,201.00		
Pasteurizers Licenses—Penalties.....	12.00		
Testers Licenses.....	979.00		
Testers Licenses—Penalties.....	2.00		
Technicians Licenses.....	124.00		
Licenses Modified.....	400.00		
Acidophilus Milk Licenses.....	100.00		
Miscellaneous.....	371.77		
DIVISION OF MARKETING			84,983.00
Bureau of Milk Control.....		100.00	
Dairy Produce Exchange Licenses.....	100.00		
Bureau of Fruit and Vegetable Standardization		67,216.00	
Seed Potato Certification—Fees.....	67,216.00		
Bureau of Weights and Measures		17,667.00	
Weightmasters Licenses.....	8,820.00		
Weightmasters Licenses—Penalties.....	1,340.00		
Additional Locations Licenses.....	1,232.50		
Additional Locations Licenses—Penalties.....	117.50		
Deputies Licenses.....	5,756.00		
Deputies Licenses—Penalties.....	326.00		
Miscellaneous.....	75.00		
Total—General Fund Revenue.....			\$125,047.74

REVENUE FOR THE FISCAL YEAR—Continued
July 1, 1953, to June 30, 1954

	Detail	Totals
DEPARTMENT OF AGRICULTURE TRUST ACCOUNT		\$217,878.84
Dairy Trust.....	\$217,878.84	
STATE DAIRY PRODUCTS TRUST FUND		424,142.51
Fees.....	419,127.94	
Interest and Penalties.....	740.95	
Sale of Books and Pamphlets.....	2,758.62	
Sale of Records.....	1,100.00	
Sale of Auto.....	405.00	
Canceled Warrant.....	10.00	
DEPARTMENT OF AGRICULTURE BUILDING FUND		214.13
Surplus Money Investment Fund.....	214.13	

REVENUE FOR THE FISCAL YEAR—Continued
July 1, 1953, to June 30, 1954

DEPARTMENT OF AGRICULTURE FUND	Detail	Subtotals	Subtotals by bureaus	Totals
DIVISION OF PLANT INDUSTRY				\$737,748.09
Bureau of Plant Quarantine			\$58,516.58	
Nursery Service		\$58,516.58		
Nursery Licenses	\$45,945.00			
Restoration Fees	1,760.50			
Acreage Fees	748.50			
Psoriasis Registry Fees	416.00			
Strawberry Certification	8,485.90			
Miscellaneous	129.75			
Interest From Surplus Money Investment Fund	1,030.93			
Bureau of Field Crops			383,242.44	
Field Crops Inspection		205,101.23		
Inspection Fees	204,061.94			
Samples Sold	374.00			
Canceled Warrants	.35			
Interest From Surplus Money Investment Fund	664.94			
Warehouse Inspection		935.17		
Warehouse Inspection Licenses	910.00			
Interest From Surplus Money Investment Fund	25.17			
Grain Warehouse Inspection		2,605.09		
Registration Fees	2,580.00			
Interest From Surplus Money Investment Fund	25.09			
Commercial Feeding Stuffs Service		173,535.62		
Tonnage Tax Penalties	388.12			
Miscellaneous Collections	115.68			
Feeding Stuffs Service Licenses	16,540.00			
Feeding Stuffs Service Licenses—Penalties	215.00			
Feeding Stuffs Tonnage Tax	155,104.51			
Interest From Surplus Money Investment Fund	1,172.31			
Terminal Weighing Service		1,065.33		
Inspection Fees	1,062.00			
Interest From Surplus Money Investment Fund	3.33			
Bureau of Chemistry			263,113.22	
Economic Poisons Service		44,941.46		
Economic Poisons Licenses	32,590.00			
Economic Poisons Licenses—Penalties	299.00			
Economic Poison Analysis Fees	50.00			
Household Licenses	230.00			
Household Licenses—Penalties	3.00			
Limited Use Sales Licenses	250.00			
Limited Use Sales Licenses—Penalties	1.50			
Supplemental Brand Fees—Licenses	10,848.00			
Interest From Surplus Money Investment Fund	118.16			
Miscellaneous	641.80			
Fertilizing Materials Service		195,975.67		
Fertilizer Licenses	11,500.00			
Fertilizer Licenses—Penalties	115.00			
Fertilizer Salesmen's Licenses	4,952.00			
Fertilizer Salesmen's Licenses—Penalties	152.00			
Agricultural Mineral Licenses	7,550.00			
Agricultural Mineral Licenses—Penalties	45.00			
Agricultural Mineral Tonnage Tax	49,740.39			
Agricultural Mineral Tonnage Tax—Penalties	451.98			
Jobbers Licenses	175.00			
Miscellaneous	358.00			
Canceled Warrants	19.42			
Fertilizer Tonnage Tax	117,874.13			
Fertilizer Tonnage Tax—Penalties	353.31			
Interest From Surplus Money Investment Fund	2,689.44			
Pest Control Operators		22,196.09		
Operator's Licenses	17,235.00			
Operator's Licenses—Penalties	410.00			
Pilots Certificates	4,440.00			
Miscellaneous	65.00			
Interest From Surplus Money Investment Fund	46.09			
Bureau of Rodent and Weed Control and Seed Inspection			32,875.85	
Seed Testing and Certification Service		32,875.85		
Seed Testing Fees	32,836.00			
Interest From Surplus Money Investment Fund	39.85			

REVENUE FOR THE FISCAL YEAR—Continued
July 1, 1953, to June 30, 1954

DEPARTMENT OF AGRICULTURE FUND	Detail	Subtotals	Subtotals by bureaus	Totals
DIVISION OF ANIMAL INDUSTRY				
Bureau of Dairy Service				\$836,459.08
Ice Cream Inspection		\$63,373.87	\$134,470.49	
Ice Cream Factory Licenses	\$61,918.60			
Ice Cream Factory Licenses—Penalties	1,455.27			
Butter Grading Service		16,150.20		
Butter Graders Licenses	89.00			
Butter Distributors Licenses	47.52			
Butter Distributors Fees—Penalties	3.78			
Butter Cutting and Wrapping Licenses	15,986.30			
Butter Cutting and Wrapping Licenses—Penalties	23.60			
Market Milk Inspection		51,218.39		
Producers and Distributors Inspection Fees	50,887.31			
Producers and Distributors Fees—Penalties	271.08			
Miscellaneous	60.00			
Glassware Testing Service		3,728.03		
Glassware Testing Fees	3,504.29			
Canceled Warrants	8.51			
Interest From Surplus Money Investment Fund	215.23			
Bureau of Livestock Identification			701,988.59	
Proceeds from Estray Animals	14,382.93	14,382.93		
Interest From Surplus Money Investment Fund	2,015.22	2,015.22		
Cattle Protection Service		682,692.11		
Hide and Brand Inspection Fees	606,334.46			
Brand Recording Fees	4,266.00			
Brand Reinstatement Fees	3,712.00			
One Year Brand Renewal Fees	39,026.00			
Brand Renewal Fees—Multiple Year	4,391.00			
Duplicate Certificate Fees	76.00			
Brand Transfer Fees	667.00			
Transportation Licenses	10.00			
Slaughterers Licenses	16,235.00			
Slaughterers Licenses—Penalties	343.00			
Public Cattle Sales Yard Licenses	7,100.00			
Public Cattle Sales Yard Licenses—Penalties	139.50			
Penalties for Use of Unrecorded Brands	279.00			
Miscellaneous	113.15			
Horse and Sheep Protection		2,898.33		
Brand Recording Fees	20.00			
Brand Renewal Fees	1.50			
Hide and Brand Inspection Fees	1,628.30			
Horse Transportation Licenses	180.00			
Horse Transportation Licenses—Penalties	12.00			
Slaughterers Licenses	985.00			
Canceled Warrants	46.53			
Slaughterers Licenses—Penalties	25.00			
DIVISION OF MARKETING				2,952,775.15
Bureau of Markets			9,048.61	
Agricultural Producers Marketing Act		8,046.24		
Commission Allowance Prorate Fees	7,783.79			
Interest From Surplus Money Investment Fund	262.45			
California Agricultural Products Marketing Act		1,002.37		
Walnuts	1,000.00			
Interest From Surplus Money Investment Fund	2.37			
Bureau of Market Enforcement			246,641.88	
Produce Dealers Service		215,305.50		
Produce Dealers Licenses	152,320.00			
Produce Dealers Licenses—Penalties	1,380.00			
Brokers Licenses	12,200.00			
Commission Merchants Licenses	7,160.00			
Agents Licenses	10,212.50			
Cash Buyers Licenses	31,360.00			
Miscellaneous	673.00			
Processors of Farm Products		31,336.38		
Processors Licenses	25,200.00			
Processors Licenses—Penalties	130.00			
Agents Licenses	4,160.00			
Statement of Intention to Finance—Fees	196.00			
Miscellaneous	120.00			
Interest From Surplus Money Investment Fund	1,530.38			

REVENUE FOR THE FISCAL YEAR—Continued
July 1, 1953, to June 30, 1954

DEPARTMENT OF AGRICULTURE FUND	Detail	Subtotals	Subtotals by bureaus	Totals
DIVISION OF MARKETING—Continued				
Bureau of Milk Control			\$746,489.19	
Fluid Milk and Cream Stabilization		\$628,861.32		
Distributor and Producer Assessments	\$533,080.08			
Distributor Licenses	4,587.00			
Distributor Licenses—Penalties	288.00			
Civil Penalties	22,086.50			
Sales Stimulation—Alameda-Contra Costa	38,279.03			
—Sacramento	23,900.02			
—San Joaquin	2,997.98			
Miscellaneous	365.05			
Canceled Warrants	19.50			
Interest From Surplus Money Investment Fund	3,258.16			
Marketing Milk and Other Dairy Products		117,627.87		
Ice Cream Manufacturer Assessments	112,415.52			
Civil Penalties	5,212.35			
Bureau of Fruit and Vegetable Standardization			434,026.38	
Canning Tomato Inspection		430,751.55		
Inspection Fees	407,081.70			
Inspections Ch. 66/51	21,429.25			
Sale of Waste Materials	2.52			
Canceled Warrants	7.50			
Interest From Surplus Money Investment Fund	2,230.58			
Seed Potato Test Plots		3,274.83		
Test Plot Fees	3,265.50			
Interest From Surplus Money Investment Fund	9.33			
Bureau of Shipping Point Inspection		1,455,895.11	1,455,895.11	
Inspection Fees	1,454,695.42			
Canceled Warrants	33.85			
Interest From Surplus Money Investment Fund	1,165.84			
Bureau of Weights and Measures			60,673.98	
Gasoline, Distillate and Oil Inspection		59,563.98		
Motor Fuel Pump Licenses	58,270.00			
Petroleum Import Certificates	125.00			
Miscellaneous	78.32			
Interest From Surplus Money Investment Fund	1,090.66			
Registration of Antifreeze		1,110.00		
Registration Fees	1,100.00			
Registration Fees—Penalties	10.00			
Total—Revenue for the Department of Agriculture Fund				\$4,526,982.32

DEPARTMENT OF AGRICULTURE BUILDING FUND
For the Fiscal Year July 1, 1953, to June 30, 1954

	Amount
Balance forwarded from 1952-53 Fiscal Year	\$98,605.06
Transferred from Department of Agriculture Fund per Ch. 11/50	300,000.00
Total	\$398,605.06
Revenue from Surplus Money Investment Fund	214.13
Total	\$398,819.19
Expenditures	\$374,411.00
Balance as of June 30, 1954	\$24,408.19

APPROPRIATIONS FROM GENERAL FUND For the Fiscal Year July 1, 1953, to June 30, 1954

GENERAL FUND	Balance as of June 30, 1953	Available	Expenditures July 1, 1953 to June 30, 1954	Less reimbursement balance	Prior expenditures	Add prior year reim- bursements	Transfers and lapsed appropriations	Balance as of June 30, 1954
Support—Department of Agriculture, Ch. 971/53, Item 40, 1953-54 F.Y.		\$5,316,149.00						
Augmented by Executive Orders:								
E53-289		159,227.00						
E53-413		31,368.00						
E53-462		78,084.00	\$5,141,864.34					
Estimated Reimbursements:								
Departmental Administrative Charges		192,361.00	190,979.00	\$1,382.00				
Office Service Unit		45,494.00	44,494.03	999.97				
Office—General Supply		4,000.00	2,790.15	1,209.85				
Bureau of Plant Quarantine		3,500.00	3,718.76	-218.76				
Bureau of Meat Inspection		40,934.00	37,772.22	3,161.78				
Bureau of Markets		202,748.00	194,760.49	7,987.51				
Bureau of Rodent and Weed Control and Seed Inspection		25,000.00	29,096.52	-4,096.52				
Bureau of Livestock Disease Control Pullorum and Paratyphoid Testing		49,800.00	41,666.40	8,133.60				
Bureau of Market News			8,812.00	-8,812.00				
Bureau of Plant Pathology		5,010.00	4,795.41	214.59				
Totals		\$6,153,675.00	\$5,700,749.32	\$9,925.02				\$442,925.66
Federal Cooperative Marketing Research, Ch. 971/53, Item 41, 1953-54 F.Y.								
Moving Expense, Ch. 971/53, Item 42, 1953-54 F.Y.		\$61,895.00	\$49,358.87					\$12,536.13
Salaries of Co. Agricultural Commissioners, Ch. 971/53, Item 414		25,000.00	2,339.05					22,660.94
Raisin Survey, Ch. 971/53, Item 286, E53-297		131,976.00	93,113.53					38,862.47
Raisin Survey, Ch. 1712/53		5,900.00	3,508.96					2,391.04
South San Francisco Livestock Market News Service, Ch. 1520/53		10,000.00	5,727.62					4,272.38
Support—Dept. of Agriculture, Ch. 3/52, Item 41, 1952-53 F.Y.		12,000.00	10,633.46		123,315.35			1,366.54
Federal Cooperative Marketing Research, Ch. 3/52, Item 42, 1952-53 F.Y.	407,253.73							283,938.38
Salaries—County Agricultural Commissioners, Ch. 3/52, Item 436, 1952-53 F.Y.	20,291.88				2,191.68			18,100.20
Executive Order E53-3, Ch. 3/52, Item 289, 1952-53 F.Y.	20,939.03				20,751.40			187.63
Executive Order E53-21, Ch. 3/53, Item 200—Sacramento Animal and Poultry Disease Laboratory	1,681.92				220.22			1,461.70
Support—Dept. of Agriculture, Ch. 1020/51, Item 39, 1951-52 F.Y.	444,202.47				-561.82			561.82
Federal Cooperative Marketing Research, Ch. 1020/51, Item 40, 1951-52 F.Y.	23,429.70				386.33		443,816.14	
Salaries of County Agricultural Commissioners, Ch. 1020/51, Item 381, 1951-52 F.Y.	84.41				*-1,653.68		25,083.38	
Support—Dept. of Agriculture, Ch. 2/50, Item 40, 1950-51 F.Y.					-10.02		84.41	
Federal Cooperative Marketing Research, Ch. 23/48, Item 45, 1948-49 F.Y.		246.53			246.53		10.02	
Totals	\$917,883.14	\$6,400,692.53	\$5,865,430.82	\$9,962.02	\$144,885.99		\$468,993.95	\$529,302.89

* To correct 1952-53 statement.

APPROPRIATIONS FROM DEPARTMENT OF AGRICULTURE FUND
For the Fiscal Year July 1, 1953, to June 30, 1954

	Balance as of June 30, 1953	Available	Expenditures July 1, 1953 to June 30, 1954	Less reimbursement balance	Prior year expenditures	Transfers and lapsed appropriations	Balance as of June 30, 1954
Support—Department of Agriculture Fund, Ch. 971/53, 1953-1954 F.Y., Item 43— Augmented by Executive Order:							
D63-222-----		\$4,315,709.00					
D64-43-----		1,000.00					
D64-48-----		148,618.00					
D64-51-----		56,200.00					
D63-114-----		128,208.00					
D63-206-----		56,311.00	\$4,325,395.51				
Estimated Reimbursements, Bureau of Milk Control-----		10,000.00	5,990.99	\$-4,009.01			
Totals-----		\$4,716,106.00	\$4,331,386.50	\$-4,009.01			\$380,710.49
Support—Bureau of Dairy Service, Ch. 3/52, 1952-53 F.Y., Item 44.5-----							
Canning Tomato Inspection, Ch. 66/51-----	\$81.01				\$597.40	\$390.00	\$81.01
Support—Department of Agriculture Fund, Ch. 3/52, Item 44, 1952-53 F.Y.-----	987.40				176,890.15		62,497.34
Support—Department of Agriculture Fund, Ch. 1020/51, Item 42, 1951-52 F.Y.-----	239,387.49				26.10	58,028.06	3,062.11
Support—Department of Agriculture Fund, Ch. 1020/51, Item 42, 1951-52 F.Y.-----	61,116.27						
Totals-----	\$301,572.17	\$4,716,106.00	\$4,331,386.50	\$-4,009.01	\$177,513.65	\$58,418.06	\$446,350.95

RECONCILIATION OF APPROPRIATION BALANCES—Continued

For the Fiscal Year July 1, 1953, to June 30, 1954

CAPITAL OUTLAY AND SAVINGS FUND									
	Balance as of June 30, 1953	Available	Actual expenditures July 1, 1953 to June 30, 1954	Prior year expenditures	Less accounts payable	Balance per budget report	Add items in transit	Balance per controller's books	
Major Construction, Improvements and Equipment—Meyers, Ch. 2/50, Item 281, 1950-51 F.Y.	\$134.77					\$134.77		\$134.77	
Major Construction, Improvements and Equipment—Truckee, Ch. 2/50, Item 282, 1950-51 F.Y.	160.09					160.09		160.09	
Executive Order E3037, Ch. 145/46, San Gabriel Animal and Poultry Disease Pathological Laboratory	2,975.04					2,975.04		2,975.04	
Executive Order E50-59, Ch. 145/46, Tulelake, Peavine and Hornbrook	1,174.07			\$849.85		324.22	4.17	328.39	
Executive Order E50-41, Ch. 145/46, Fresno Pathological Laboratory	217.02			—75.08		292.10		292.10	
Executive Order E51-79, Ch. 145/46, Daguerre	241.81					241.81		241.81	
Minor Construction, Improvements, Repairs and Equipment, Ch. 1020/51, Item 271	67.09					67.09		67.09	
Construction, Improvements, Repairs and Equipment, Ch. 700-49, Item 282	175.59					175.59		175.59	
Major Construction, Improvements and Equipment, Ch. 3/52, Item 294	767.68					767.68		767.68	
(a) Tulelake	750.00		\$—18,145.75			18,895.75		18,895.75	
(b) Peavine	750.00		—12,519.82			13,269.82		13,269.82	
(c) Yermo			—23,470.30			23,470.30	1.58	23,471.88	
(d) Coleville	750.00		739.42			10.58		10.58	
(e) Alturas	750.00					750.00		750.00	
(f) Benton	750.00		747.53			2.47		2.47	
(g) Banning-Beaumont	22,560.00			22,310.00		250.00		250.00	
Minor Construction, Improvements, Repairs and Equipment, Ch. 3/52, Item 295	1,301.70		—4,131.12			5,432.82		5,432.82	
Major Construction, Improvements and Equipment, E.O. E52-378, Ch. 1020/51, Item 362.3, Truckee Wye			—488.51			488.51		488.51	
Miscellaneous Repairs, Improvements and Equipment, E.O. E52-550, Ch. 1020/51, Item 362.3	7,330.70		1,109.76	4,822.74		1,398.20	155.62	1,553.82	
Executive Order E32-500, Ch. 42/50, Meyers			—190.74			190.74		190.74	
Acquisition of Real Property, Ch. 971/53, Item 287		1,350.00				1,350.00		1,350.00	
Major Construction, Ch. 1020/51, E53-299, Item 362.3		7,390.00	7,390.00						
Major Construction, Ch. 971/51									
Executive Order E53-396, Item 393		7,810.00	7,810.00						
Executive Order E53-430, Item 392		85.00	85.00						
Executive Order E54-36, Item 392		650.00	650.00						
Executive Order E53-37, Item 392		1,000.00	1,000.00						
Executive Order E54-177, Item 392		143.44	143.44						
Minor Construction, Ch. 3/52		7,710.00	7,710.00						
Executive Order E54-415									
Major Construction, Ch. 42/50				6,284.85		6,284.85		6,284.85	
Executive Order E52-256									
Totals	\$40,855.56	\$20,138.44	\$—31,561.09	\$21,622.66		\$76,932.43	\$161.37	\$77,093.80	

STATEMENT OF COLLECTIONS AND EXPENDITURES
For the Fiscal Year July 1, 1953, to June 30, 1954

	Balance as of June 30, 1953	Collections		Other items	Expenditures July 1, 1953 to June 30, 1954	Prior year expenditures	Transferred by State Employees' Retirement Fund	Balance as of June 30, 1954
		1953-54	1954-55					
DEPARTMENT OF AGRICULTURE FUND								
Nursery Service.....	\$212,094.19	\$53,516.58	\$51,968.50	\$ - 146.75	\$94,710.69	\$317.62	\$5,249.10	\$222,301.86
Bonded Warehouse Inspection.....	4,577.03	935.17	—	—	65.97	— 40	— 30	5,509.58
Field Crops Inspection.....	135,540.19	205,101.23	—	—	202,308.50	5,011.42	11,181.91	120,139.59
Grain Warehouse Inspection.....	4,102.11	2,065.09	—	—	3,280.54	1.68	232.84	3,107.44
Commercial Feeding Stuffs Service.....	238,748.49	175,535.92	—	—	201,153.66	2,705.44	12,935.65	196,488.36
Terminal Weighing Service.....	12,951.02	44,065.33	—	—	55,116.35	9.69	22,762.66	22,778.38
Economic Poisons Service.....	19,855.46	193,975.67	24,669.00	—	55,362.67	897.70	3,776.56	22,774.49
Fertilizing Materials Service.....	551,721.32	29,908.00	4,950.00	—	20,893.71	283.40	14,153.82	524,614.84
Agricultural Pest Control.....	1,231.32	32,575.85	—	—	31,487.99	268.25	1,751.45	1,932.67
Seed Testing and Certification.....	3,206.72	134,170.49	—	—	119,366.25	1,361.05	7,612.12	52,763.61
Bureau of Dairy Service.....	46,661.54	701,988.59	—	—	594,653.74	12,103.60	37,974.37	485,894.33
Livestock Identification.....	428,637.45	746,489.19	—	\$6,762.65	654,161.57	8,340.14	33,673.46	667,512.75
Bureau of Milk Control.....	644,820.32	—	—	—	32,098.43	72.38	2,213.43	—
Dairy Service.....	751.78	1,002.37	—	—	1,463.18	—	61.44	229.53
Agricultural Products Marketing Act.....	51,828.25	8,046.24	—	—	7,181.81	— 20.81	304.27	52,409.22
Agricultural Producers Marketing Act.....	295,222.07	246,641.88	7,734.50	—	212,404.18	3,069.78	12,045.22	322,079.37
Bureau of Market Enforcement.....	430,727.52	430,751.55	—	—	364,761.38	3,767.67	6,900.00	464,530.77
Canning Tomato Inspection.....	— 27,781.08	—	—	—	—	597.40	—	— 6,949.23
Canning Tomato Inspection, Ch. 66/51.....	— 310.94	3,274.83	—	—	1,384.60	1,883.06	74.84	378.61
Seed Potato Testing.....	298,817.21	1,455,895.11	—	—	1,375,947.30	124,966.72	57,213.76	196,884.54
Shipping Point Inspection.....	247,047.92	60,673.98	103,674.00	—	146,604.31	433.26	9,033.08	255,325.25
Gasoline, Distillate and Oil Inspection.....	—	—	—	—	—	—	—	—
Totals.....	\$3,589,864.55	\$4,526,982.32	\$193,296.00	\$6,715.90	\$4,331,623.70	\$168,765.45	\$217,920.29	\$3,568,549.33
LESS: Transfer to Department of Agriculture Building Fund, Ch. 11/50.....	—	—	—	—	—	—	—	\$ - 661,168.00
								\$2,937,381.33

1 Payment on loan.

2 Estimated reimbursements.

3 Transfer to Ch. 66/51.

4 Transferred from Canning Tomato.

CALIFORNIA DAIRY INDUSTRY ADVISORY BOARD	Balance as of June 30, 1953	Collections	Expenditures		Prior year	Transfer to State Em- ployees' Retirement System		Balance as of June 30, 1954
			Advisory Board	Department of Agriculture		Advisory Board	Department of Agriculture	
CALIFORNIA DAIRY INDUSTRY ADVISORY BOARD Chapter 1217/45 and 54/49	\$183,107.88	\$424,142.51	\$298,911.04	\$14,457.10	\$44,517.23	\$2,718.81	\$407.70	\$246,238.49

STATEMENT OF REVENUE AND EXPENDITURES
Department of Agriculture Trust Account For the Fiscal Year July 1, 1953, to June 30, 1954

	Balance as of June 30, 1953	Collections July 1, 1953 to June 30, 1954	Expenditures	Transfer to State Employees' Retirement System	Balance as of June 30, 1954
BUREAU OF DAIRY SERVICE TRUST PROJECTS					
San Joaquin-Sacramento Valley Market Milk Distributors	\$2,543.87	\$4,664.00	\$4,765.60	\$172.54	\$2,269.73
South San Joaquin Operators	5,205.92	34,257.51	26,046.89	1,705.54	11,711.00
Northern Counties Operators	1,001.37	1,586.03	1,451.15	43.77	1,092.48
Fresno County	1,447.29	5,400.00	5,695.42	421.56	730.31
Humboldt County and Del Norte County Operators	6,066.90	21,994.16	17,731.69	817.58	9,511.79
Coast Region Manufacturing Concerns	3,792.73	12,636.24	6,890.90	421.56	9,116.51
Sacramento Valley Operators	4,105.29	27,579.70	24,805.11	1,593.01	5,286.87
North San Joaquin Operators	17,188.45	79,784.76	67,163.42	4,059.61	25,750.18
San Francisco Bay Area Milk Dealers	3,410.45	4,290.00	4,744.64	78.99	2,876.82
Milk Dealers and Distributors in Southern California Area	2,869.14	7,801.00	7,827.37	421.55	2,421.22
Northern and Central California Milk Products Processors	2,924.18	3,600.00	4,552.28	293.14	1,078.76
Salinas-San Luis Obispo Operators	1,502.67	9,285.44	7,533.69	421.56	2,832.86
Total	\$52,058.26	\$212,878.84	\$179,208.16	\$10,450.41	\$75,278.53
BUREAU OF RODENT AND WEED CONTROL AND SEED INSPECTION					
California Crop Improvement Associations	\$7,707.89	\$5,000.00	\$9,578.98	\$504.50	\$2,624.41
BUREAU OF CHEMISTRY, SPRAY RESIDUE INSPECTION TRUST PROJECTS					
General Spray Residue Trust Project	\$9,748.61		\$538.85		\$9,209.76
San Diego Spray Residue Trust Project	1,437.64				1,437.64
Los Angeles County Region Spray Residue Trust Project	1,991.42		406.22		1,585.20
Total	\$13,177.67		\$945.07		\$12,232.60
Grand total	\$72,943.82	\$217,878.84	\$189,732.21	\$10,954.91	\$90,135.54

CALIFORNIA MARKETING ACT AND AGRICULTURAL PRODUCERS MARKETING ACT
For the Fiscal Year July 1, 1953, to June 30, 1954

	Balance as of June 30, 1953	Collections	Other items	Expenditures	Pro-rata refund	Distribution of pool sale proceeds	Agricultural Prorate Advisory Commission fees	Balance as of June 30, 1954
CALIFORNIA MARKETING ACT								
Fresh Bartlett Pears.....	\$27,477.44	\$18,916.82		\$22,514.28				\$23,879.98
Canning and Freezing Cling Peaches Administration.....	141,384.83	366,886.64	{ 1—\$250.00 460,000.00 }	565,967.56				2,053.91
Advertising.....	95,129.03	1,490,252.92	1—380.00	1,328,011.76				257,020.19
Canning Asparagus.....	829.31	2,171.00	2—3,000.31	78.99				727.16
Dates.....	147.83	500.34						687.35
Dates-Substandard Pool.....	687.35							664,802.44
Wine.....	554,962.42	2,010,735.40	11,250.00	1,902,145.38				727.16
Grapefruit Advisory Board.....	14,582.03	25,351.68		22,163.91				17,769.80
Figs, Fall and Winter Pears Administration.....	970.23	5,935.82		6,249.56				856.49
Sales Promotion.....	3,850.23	29,468.06		23,604.40				2,688.91
Canning Fall and Winter Pears.....	5,817.06	30,468.10		23,332.31	\$5,402.41			5,617.44
Dry Pack Lettuce.....	22,046.27	23,249.40		44,335.20				2,956.47
Grapefruit Industry Board Administration and Operation.....	1,345.94	7.33						1,353.27
Advertising and Trade Promotion.....	3,799.74							3,799.74
Poultry Improvement Administration.....	12,440.41	38,700.41	1—450.00	46,805.18				3,975.67
Service Charges.....	8,391.56	89,398.34		94,535.60				3,254.30
Marketing Order for Figs Administration.....	5,725.35		\$5,803.55	49,207.44				16,744.68
Advertising.....	173,460.25	54,423.22		37,409.36				18,003.17
California Canned Olives and California Green Olives.....	3,472.23	55,512.53	1700.00	248,452.14				166,092.06
Coachella Valley Green Corn Turkey Breeding.....	13,947.23	240,383.95		2,009.62				862.91
Early Apples.....	8,591.76	15,977.70		22,404.53				7,320.14
Wine Processors.....	471.53	30,559.26		38,956.49				632.14
Raisins.....	194,033.06	300,588.16		424,280.79				70,340.13
California Fresh Plums.....	95.78	20,166.47	2—3,003.00	26,195.62				66.73
Grape Stabilization—Administration.....	1,481.64			89,539.43				1,481.64
California Fresh Peaches.....	23,790.90	78,017.02		134,553.92				12,983.64
Fresh Bartlett Pears Sales Promotion.....	57,789.88	97,348.10		124,647.40				20,581.00
Lima Beans.....	4,601.31	183,287.16	6—5,000.00					58,241.07
Bedding Plants.....	12,267.43	55,078.90	1—120.00	56,652.85				10,573.48

Lemon Products.....	17,518.28	98,908.75	1400.00	69,228.49		47,593.54
Lemon Advertising.....	24,571.76	1,071,904.86		584,858.91		541,617.71
Lemon Products Stabilization.....	290,711.34	23,874.11			76,110.41	198,475.04
Turkey Promotion.....	5,177.18	95,430.64	7 1,000.00	84,575.23		15,032.59
Extracted Honey.....	25,692.58	27,358.45		41,593.26		11,457.77
Olive Stabilization.....	25,752.27	3,969.65		2,287.01	22,142.64	5,292.27
Winter Head Lettuce.....	74.86	250.00		284.96		39.90
Newton Pippin Apples.....	23.84		—23.84			
Grapes for Crushing.....	1,207.47		—71,207.47			
Marketing Order for Prunes.....	57,950.04	447,230.32		384,224.64		120,964.72
Grape and Wine Stabilization.....	544.58			544.58		
Long White Potatoes.....	2,345.22	90,181.38		44,386.74		58,639.86
Delta White Potatoes.....		9,157.65		5,330.44		2,827.21
Fresh Asparagus.....		10,723.05	\$10,000.00	5,083.06		5,639.99
Processing Asparagus.....		50,306.51	7—1,000.00	8,363.38		44,933.44
Processing Tomatoes.....		4,769.79	1—10.00	4,767.35		2.44
Bush Berries for Processing.....		1,502.00	43,000.31	1,294.36		207.64
Northern California Potatoes.....		1,500.00		287.82		1,212.18
Totals.....	\$1,805,139.81	\$7,204,633.92	\$66,242.24	\$6,543,745.26	\$103,655.46	\$2,428,615.25
AGRICULTURAL PRODUCERS MARKETING ACT						
Pear Crop Survey.....	\$16,402.03	\$14,710.00	\$100.00	\$15,041.74		\$170.29
Canning Bartlett Pear Zone 1.....	{ 35,291.66 }		1—16,000.00			
	{ 3156.42 }		57,500.00			
Canning Bartlett Pears—Sales Stimulation.....		137,808.44	\$156.42	129,136.73	\$6,890.43	8,165.40
Marketing Program for Figs.....	70,774.41	108,485.87	6—156.42	137,359.13	1,019.86	34,381.29
	6,784.87	1,148.93	7—7,500.00	2,256.75	—126.50	2.92
			2—5,803.55			
			32.32			
Substandard Pool for Figs.....	{ 33,403.63 }		85.67	56,793.60	\$93,175.01	87,321.54
	{ 35.67 }		41,500.00			
Asparagus.....	991.89		6—5.67	34.66		987.23
Totals.....	\$163,810.58	\$465,534.09	\$—20,200.63	\$340,622.61	\$93,175.01	\$130,998.67
Totals—Marketing Trust Account.....	\$1,968,980.39	\$7,670,168.01	\$46,041.61	\$6,884,367.87	\$7,783.79	\$2,559,613.92

¹ Transferred to match federal funds.

² Transferred to marketing order.

³ Unclaimed checks.

⁴ Return of travel advance.

⁵ Transferred from sales stimulation.

⁶ Unclaimed checks transferred to current account.

⁷ Transferred to zone.

⁸ Proceeds from unclaimed checks.

DIVISION OF PLANT INDUSTRY

CHAS. V. DICK, *Chief*

The Division of Plant Industry includes the Bureaus of Entomology, Plant Pathology, Plant Quarantine, Rodent and Weed Control and Seed Inspection, Chemistry and Field Crops.

Primary responsibilities of the division are:

1. Prevention of the introduction and spread of plant diseases, noxious weeds and crop pests such as insects and other animals. This function involves quarantine action, detection surveys and suppressive measures.
2. Control of predatory animals as a protection to the livestock industry.
3. Prevention of fraud and deception in the marketing of particular commodities, used by producers, such as livestock feeding stuffs, seeds, fertilizers and pesticides.
4. Regulation of the use of agricultural chemicals to obtain satisfactory control and prevent damage to persons and property. This work is coordinated with farmers and commercial pest control operators who apply such materials, as well as checking produce (including hay and livestock feed stuffs) for spray residue.
5. Grading of field crops under United States Grades.
6. Regulation of agricultural warehouses.

Of particular concern in 1954 were the finding of an infestation of Mexican fruit fly along the Mexican border, and the determination that Khapra beetle was established in several areas of the State. These two projects have placed a heavy load on the staffs and resources of the Bureau of Entomology, the Bureau of Plant Quarantine, and the county agricultural commissioners.

BUREAU OF ENTOMOLOGY

H. M. ARMITAGE, *Chief*

The Bureau of Entomology conducts insect pest surveys, eradication projects directed against incipient infestations of major pests new to or not widely distributed in the State, and seasonal control measures against certain pests of general occurrence not amenable to individual grower control. It also renders advisory assistance to county agricultural commissioners in meeting local pest control problems of a regulatory nature. Insect identification is an important part of these activities. The bureau is responsible for supervising, on a state-wide basis, the apiary inspection work carried out by agricultural commissioners in their respective counties. The results of these activities during 1954 are summarized on the following pages.

INSECT PEST DETECTION SURVEY

H. T. OSBORN, *Entomologist in Charge*

During 1954 a total of 12,754 man-hours was devoted to state-county cooperative insect pest survey of which 45 percent was expended in Southern California, 48 percent in Central California and 7 percent in Northern California. The records further show that 52 percent of this survey work was conducted by state personnel. However, it should be pointed out that many of the counties conduct extensive insect surveys independently which are not included in these figures. Some of these are purely for detection purposes, but many are in the nature of observations in the course of service calls.

In planning detection surveys against specific insects, emphasis is placed on those known in other regions to be major pests which are considered likely to become established in California and consequently are the subject of restrictive quarantines. Specific state-wide detection surveys during the past year have been conducted for the pink bollworm, the Japanese beetle and the Mexican fruit fly. The Khapra beetle, first found in California in 1953, has been the subject of very extensive survey in cooperation with both the counties and the federal Department of Agriculture. Survey for the European corn borer was not repeated this year on a state-wide basis but has been conducted as a county responsibility. Trapping for Oriental fruit fly has also been discontinued on a state-wide basis, following research which gives a better understanding with regard to its climatic limitations.

In the course of specific surveys, a single Japanese beetle was taken from a trap put out for that purpose in Los Angeles County, and a single Mexican fruit fly from a trap near the international boundary in San Diego County.

In addition to specific surveys, similar effort of a more general nature on the part of state and county personnel, and of individuals, has resulted in the finding of a number of insects of possible economic importance, for the first time, in California, and has indicated spread of several established insects to new localities within the State.

The more important of these activities are discussed in the following paragraphs.

Pink bollworm, *Pectinophora gossypiella*: Though the pink bollworm now occurs in most of the cotton-growing regions of the world, it has not as yet been found infesting cotton planting in California. However, the extremely heavy losses occasioned by its presence in many of the areas where it does occur, together with the ease with which it is known to be carried in commerce and travel to new territory, point to it as possibly the most serious insect threat to the cotton industry in California. For this reason an annual survey is conducted with the hope that any introductions which may become established will be detected soon enough to permit eradication. It is conducted in cooperation with the Federal Pink Bollworm Control Project and with the agricultural commissioners of the cotton producing counties. In 1954 state personnel contributed 3,268 man-hours to this survey, and county personnel 3,550 man-hours.

During the early cotton-growing season when no bolls are present the moths from overwintering larvae oviposit on the flower buds or squares. Larvae hatching from these eggs mature at about the time the flower opens and seal the petals together

to form a rosette which can easily be seen by an inspector. The optimum period for bloom inspection in California appears to last for only a few days in any one field which would be a serious limitation in any comprehensive state-wide survey.

While a valuable method of survey in infested areas to determine early season populations, it has not been adopted as a detection method in new territory. For this reason bloom inspections in California have been limited to selected fields in localities of particular hazard. In 1954, 114,726 blooms were inspected from 111 fields located in seven counties without finding any showing the rosetted appearance indicative of pink bollworm infestation.

As soon as bolls begin to appear in the field the moths oviposit at the base of the boll underneath the calyx. The larvae on hatching bore into the bolls making a tunnel inside the rind before entering a seed to complete development. Cutting and examining mature green bolls during the picking season to look for this characteristic injury has proved to be a very effective method of detecting infestation by the pink bollworm. A total of 79,840 bolls were collected and examined during the 1954 cotton picking season in California from 1,154 fields having an estimated 176,810 acres located in 11 counties. At the invitation of the Director of Plant Industry in Nevada, a joint survey of 2,000 acres planted to cotton in Nevada was made by the examination of 2,100 bolls from 10 fields in Nye County and one field in Clark County. No pink bollworms were found in any of the bolls examined from fields located in California or Nevada.

Experience in infested zones has proved the use of gin trash inspection machines to be the most practical and effective method of detecting extremely light populations of pink bollworm, and this has continued to be the principle method of survey in California.

For the fourth consecutive year gin trash inspections were intensified in the San Joaquin Valley because of the finding of live pink bollworms, in 1951, by the Kern County Agricultural Commissioner's office, in mechanical cotton pickers used in the infested area in Texas and then brought to California. A very intensive sampling of the gin trash in Imperial and Riverside Counties was also repeated again this year. Localities in these counties would seem to offer a particular hazard for introduction of the pink bollworm because they are on direct lines of travel from infested areas in Texas and New Mexico. Also, they are adjacent to extensive plantings in Mexico which may eventually be found to be infested.

In making gin trash inspection samples of first cleaner trash are obtained from as many gins as possible in each county and brought to a central location where they are processed through an inspection machine which separates out any pink bollworms present. While the exact location in the field from which these samples are taken is not known, the methods of harvest are such that each bushel sampled probably contains trash from several acres and constitutes a representative sample from a field. In order to obtain a comprehensive sampling, collections are made throughout the main cotton picking season.

Five gin trash inspection machines were loaned to the State of California by the Federal Pink Bollworm Control Project, in 1952, and have since then been operated in California by state and county personnel. Gin trash inspections were commenced in the San Joaquin Valley, in Kern County, on October 4, and continued until November 24. In Fresno, Kern and Tulare Counties machines were located throughout the inspection period. One machine was operated successively in Kings, Madera and Merced Counties. One machine alternated at two-week periods in Riverside and Imperial Counties. Inspections were started at Blythe the week of October 18 and completed in Imperial County December 10.

A total of 25,977 bushels of gin trash was collected and processed through the five gin trash inspection machines. It was collected from 136 of the 214 cotton ginning locations operating in the State. This is considered to represent a well-distributed and comprehensive sampling of the gin trash from the 907,000 acres of cotton planted in California during 1954. It compares with 19,985 bushels of gin trash sampled from 152 gins in 1953, and with 12,676 bushels of gin trash sampled from 178 gins in 1952. No pink bollworms or boll weevils were found in any of the trash inspected.

Japanese Beetle, *Popillia japonica*: The United States Department of Agriculture furnished 1,094 standard Japanese beetle detection traps together with the necessary lure in the form of anethole-eugenol, distributed by the State to 24 counties for trapping use in the vicinity of airports and other critical areas; 742 traps were operated in the Los Angeles County area; 74 traps were located in a well-distributed pattern in Orange County. Because of cross-country flights landing in the San

Francisco Bay area, San Mateo had 28 traps in areas surrounding the San Francisco International Airport; Alameda County had 31, mostly near East Bay airports. The military airport at Travis Field, Solano County, had 12 traps, and Moffet Field, Santa Clara County, had 10. Other military and civilian air fields at which traps were located included those in Sacramento, San Joaquin, Riverside and San Bernardino Counties and the San Diego harbor district. In most of the counties cooperating the traps were placed out during June and operated through August. Of the 742 traps placed in Los Angeles, 218 were out from May 3 until June 30; the balance remained in service until August 31.

On June 29, a gravid female Japanese beetle was captured in a trap located in the approach area to the Los Angeles International Airport. Fifty-six traps were being serviced by the county in the approach area at that time. Fifty additional traps were immediately placed out and this was increased, with the assistance of state personnel, to 490 traps during July in a pattern radiating out for three or four miles from the finding. These were serviced at weekly intervals until August 31, but no additional Japanese beetles were taken.

The trap in which this Japanese beetle was captured was located approximately three-fourths of a mile from a trap location where a female Japanese beetle was taken from a trap on July 20, 1951. These are the only Japanese beetles to be captured in a trapping program conducted each year since 1937. On the basis of present information it would seem reasonable to believe that both of these beetles were carried in by plane and did not come from established local infestations.

Mexican Fruit Fly, *Anastrepha ludens*: The Mexican fruit fly is a native insect of the mountain ranges of northeastern Mexico where it occurs on the fruits of a wild tree, the yellow chapote, *Sargentia greggii*, which is a member of the citrus family. Within the past 100 years, it has been carried in commerce to many parts of Mexico and has become a serious pest of such fruits as mango, grapefruit, orange, sapotes and cherimoya. It is the principal citrus-infesting fly native to Mexico. It is also known to attack deciduous fruits, and peach is said to be a favored host. The fly seems able to adapt itself to a wide range of climatic conditions. Reports of serious damage have indicated heavy populations of the fly in central Mexico, at elevations of 3,000 to 5,000 feet, where a succession of host fruits is available throughout the year. It has also become established on the coastal plains. It occurs now in both humid and dry regions and is said to withstand freezing weather. That it constitutes a serious threat to the fruit industry of California has been acknowledged for many years by the restrictive quarantines that have been enforced against it.

On January 22, 1954, a single female Mexican fruit fly was captured in one of 83 traps placed out on five properties in the vicinity of Tijuana, Mexico, by the Citrus Black Fly and Mexican Fruit Fly Control Project of the United States Department of Agriculture, working in agreement with the Mexican Department of Agriculture. This is the first capture of a Mexican fruit fly in Baja California. The trap of the McPhail glass type baited with brown sugar and water was hanging in an orange tree in a small mixed planting of 11 acres with a variety of fruit trees constituting a succession of susceptible hosts. This orchard is four and one-half miles east of Tijuana and two and one-half miles south of the international boundary. The traps had been operated in the Tijuana vicinity for the previous five months as part of a trapping survey conducted intermittently in the vicinities of Tijuana, Mexicali, Ensenada in Baja California and Hermosillo, Sonora, for the past several years. The only previous capture had resulted in finding for the first time of an infestation at Hermosillo, which is more than 500 miles distant. Since no wild hosts are known to occur in northern Baja California, it seemed reasonable to believe that the fly had emerged from soil in the orchard or some other property in the vicinity and suggested an incipient infestation as the result of larvae escaping from fruits brought in from the infested areas along the west coast of Mexico, with mangoes particularly suspected.

Following the information that a female Mexican fruit fly had been taken near Tijuana, the Commissioner of San Diego County took immediate action to survey the situation. He participated with the federal area leader in the cutting and inspection of fallen fruits in the suspected orchard in an effort to determine the extent of infestation. No larval infestation was found. At the same time, he initiated a survey by properties to locate all possible host plants in an area approximately five miles wide just north of the border and began placing fruit fly traps. As a result of this initial survey, 5,704 hosts were counted on 723 properties. A meeting at Chula Vista was attended by 10 of the county staff and two from the Bureau of Entomology at which the federal area leader discussed the Mexican fruit fly and

methods for detecting it based on his many years of experience in infested areas. The glass type McPhail traps baited with a solution made by dissolving six pounds of brown sugar in five gallons of water have proved to be the most practical method of detection. This is supplemented by fruit inspection for larvae to confirm established infestations.

Approximately 800 of the McPhail traps had been held in reserve in Sacramento for just such an emergency and were immediately available; 312 were placed out in San Diego County during early February, located on 82 properties within 10 miles of the international boundary. One hundred of these traps were in the immediate vicinity of San Ysidro. At the same time, 310 traps were placed in Imperial County at 111 locations, in a 10-mile zone north of the international boundary, including both Imperial and Bard Valley localities. Grapefruit, orange, white sapote and cherimoya trees were favored for trap locations at this season. These traps were serviced at least once each week by county inspectors and personnel reporting to the State Insect Survey until April 10 in San Diego and until May 14 in Imperial County, after which they reported to the State Mexican Fruit Fly Control Project. During this period the state survey contributed 476 man-hours in San Diego County and the county 891 man-hours, in the operation of these traps and in a limited amount of larval inspections. In Imperial County 850 man-hours were furnished by the state survey and 392 by the county.

In May detection survey trapping was extended to include other areas in Southern California. The number of traps and locations varied from time to time but reached a maximum of 99 traps at 92 properties in Riverside County, 102 at 34 locations in San Bernardino County, 100 at 98 locations in Los Angeles and 98 at 34 properties in Orange County; these were operated by county personnel. Los Angeles and San Bernardino Counties discontinued trapping October 1. The maximum number of survey traps operated in San Diego by county and state personnel reached 927 in 257 locations and in Imperial to 314 traps in 104 locations; 40,633 trap inspections were made by state and county inspectors in this survey trapping program, requiring 7,813 man-hours of inspection and 29,439 miles of travel.

On August 1, the Federal Mexican Fruit Fly Program took over trapping in the 10-mile zone adjoining the international boundary, in Imperial and San Diego Counties, and increased the number of traps cared for to 1,500 in San Diego County and 350 in Imperial County. They also placed 450 traps in Yuma County, Arizona.

A female Mexican fruit fly was taken August 9 in a trap placed in a grapefruit tree in San Ysidro, San Diego County. The trap was first placed in this tree early in February and had been serviced continuously since then. This find was not unexpected, since this trap is located only one mile from the international boundary and approximately one and one-half miles from one of the properties in Tijuana on which Mexican fruit flies have been taken; the property was already included in the spray program. Trapping within the control zone was taken over as a part of the control operation and the number of traps in this zone was increased to reach a maximum of 735 in December.

During May, June and July, larval inspections were made in San Diego, Imperial, Orange, Riverside and San Bernardino Counties by federal and county inspectors. This has included larval inspections on 3,945 properties and the inspection of 269,958 fruits requiring 3,726 man-hours inspection by the counties and 2,800 hours by federal inspectors, with travel by car totaling 10,657 miles. No further specimens, in any stage, have been taken since the initial finding in August, 1954.

Pittosporum Eriococcus Scale, *Eriococcus pittospori* Ferris: In the course of general survey in the San Francisco area, the attention of one of the survey entomologists was called to an infestation of a scale on *Pittosporum tenuifolium* in a hedge bordering the nursery in Golden Gate Park. The infestation was heavy on some of the plants and evidently of long standing. It was first noticed by the park staff, when the hedge containing dead and dying plants was cut back in the spring. The scales were found on the main trunks which may account for the infestation building up in previous years without being noticed. Collections were submitted to Sacramento where they were identified as an undescribed species of *Eriococcus* not previously reported in California. It has since been named and is considered to belong to a group of scale insects probably indigenous to the Australian region. Additional survey resulted in the finding of this scale insect also on *Pittosporum undulatum*, *P. crassifolium*, *P. eugenoides* and *Coprosma baueri*, in an area extending for about one mile in the park. Light infestations were also found on plants in several residential blocks, adjoining the infested area in the park. Inspections made in other parks and playgrounds in the city, where these hosts are

planted, has failed as yet to locate any infestation outside of the restricted Golden Gate Park locality.

Khapra Beetle, *Trogoderma granarium*: This insect first identified in California from two large warehouses in Tulare County, November, 1953, was later found in Imperial and Riverside Counties. Enormous populations had developed on bulk grain in current season storage. It was also learned from the management of a feed and grain storage company in Fresno an infestation, first noticed in 1946, had increased to such an extent by 1949 that drastic methods to eradicate it were necessary. Although no living specimens were found in 1953, definite determinations of this species were made from dead specimens packed in crevices of the brick walls. Shipment of empty bags from this warehouse to Alpaugh while the infestation was still active explained the source of infestation there. Since grain had been widely distributed from these infested premises, it was anticipated that many new infestations would develop. For this reason surveys initiated in 1953 were continued through 1954.

Early in 1954 the insect was reported in Arizona. By this time the Western Plant Board had become concerned with the possibility of distribution to other states and petitioned the Federal Government for assistance in conducting a detection survey. This was conducted by the Federal Economic Insect Survey during April, May and June and resulted in the finding of three infestations in two counties in New Mexico. At the end of this period, 11 infested premises had been located in five counties in Arizona. In California 11 premises were known to be actively infested at this time in five counties, as follows: Imperial five, Kern two, Riverside one, Tulare two, and Fresno one.

In July two federal inspectors were assigned to cooperate with the state and county commissioners in the Khapra beetle detection survey in California. In making this cooperative survey the general plan was to inspect representative grain handling establishments in various parts of the State with particular attention given to the larger distributing and wholesale plants though inspections were also made in feed mixing plants, feed stores and larger feed yards which might have stored grain.

As a result of this combined effort 57 premises in 10 counties had been found infested at the end of the year as follows: Fresno 10, Imperial 20, Kern 14, Kings three, Los Angeles one, Madera one, Riverside three, San Bernardino one, San Francisco one, and Tulare three. Most of these infestations were found during the latter part of the year, and appeared to be of recent origin usually as the result of having received bulk or sacked grain or empty burlap bags direct from infested properties.

Among the insects identified from the many collections submitted during the course of his survey, there have been six species of *Trogoderma* other than the Khapra beetle found associated with grain storage; namely, *Trogoderma versicolor*, *Trogoderma simplex*, *Trogoderma parabile*, *Trogoderma sternale*, *Trogoderma grassmani*, and *Trogoderma ornatum*. These are considered to be native to or of long standing in California. Unlike the Khapra beetle they are capable of flight and appear to be generally distributed in the State. Several of them at least normally occur outdoors, in such habitats as insect galls and bee nests. They also feed on stored grain or other products. They have been found heavily infesting and damaging grain in some instances, but in no case have larvae been found in the enormous swarming masses, characteristic of the Khapra beetle. Like the Khapra beetle, the larvae also crawl into minute crevices in the floors or walls and under loose plaster or boards or empty burlap bags.

The larvae so closely resemble those of the Khapra beetle that it is impossible to distinguish them in the field. This has greatly increased the difficulties of inspection for incipient infestations, since a few specimen of Khapra beetle larvae can easily be missed if present in a mixed population. Collections from all properties inspected are therefore submitted to Sacramento for positive identification before a premise is declared to be infested.

In the conduct of this cooperative survey, the federal inspectors have contributed 890 man-hours during the inspection of 554 properties in 26 counties. They have at all times been working in cooperation with the commissioner and much of the time in company with state or county inspectors. The State has supplied 772 man-hours in the inspection of 279 premises in 32 counties. The county inspectors have added 758 man-hours to inspection in company with either state or federal inspectors. The counties have also contributed a very large amount of inspection independently. Forty commissioners reported 5,631 man-hours in making inspections of 2,122 premises.

A Wheat Sawfly, *Pachynematus sporax*: Larvae of this leaf feeding sawfly were first reported by the agricultural commissioner of Santa Barbara County in April, 1951, from a wheat field near Cuyama. By 1953 the infestation had increased to such an extent that 200 acres of wheat were completely destroyed. Since no adults were present at the time these observations were made, determination was made only as *Pachynematus* sp. On March 11, 1954, the infested area was visited by a state survey entomologist together with the county district inspector. They found adults swarming and noted dispersal outward to include an area approximately 10 miles long by one mile wide, within which was planted some 4,000 acres of wheat. Among a large number of specimens collected were six males, necessary to secure a specific determination. Submitted to taxonomic authorities they were reported to be *Pachynematus sporax* Ross. *P. sporax* was described in 1945 from males that were collected at Pullman, Washington, 1907; Medford, Oregon, 1918; Parma, Idaho, 1927; Lewiston and Lenore, Idaho, 1937; and Saskatoon, Saskatchewan, Canada, 1939. No host plants were recorded. There is no previous record of the species in California. Correspondence with entomologists and officials in Oregon, Idaho and Washington has developed no further information regarding this species. The Canadian Department of Agriculture, Field Crops Insect Laboratory, Lethbridge, Alberta, supplied the information that a number of larvae of this species was found feeding on leaves of wheat at Turin, Alberta, in 1946. The feeding was not sufficient to defoliate the plants and has not been observed since. While these collection records indicate a wide natural range, the sudden appearance in an isolated area strongly suggests a carry-in. In view of the outward spread each year and the threatened total loss of several thousand acres in 1954, a suppressive control was authorized to reduce existing populations and restrict outward spread, pending development of additional information sufficient to justify an eradication program. For this reason survey was repeated in early April when small larvae were present, in order more accurately to delimit the infestation. This resulted in the finding of a small number of larvae in fields extending outward from the previously determined area and one heavily infested spot in Salisbury Canyon. The infested area, as finally determined, extended from one mile east of U. S. Highway 399-Highway 166 junction, to one mile west of New Cuyama. This comprised an irregular area approximately 12 miles long by two to six miles wide, within which were 12,075 acres to be treated; 1,491 acres were in San Luis Obispo County. The sawfly has been found almost exclusively on wheat. None have been taken in grasslands, although San Luis Obispo County reports one instance where larvae were found feeding on Foxtail chess, *Bromus rubens*, in an infested wheat field. A few have been observed on barley plants close to wheat in the heavily infested area.

Inspections were repeated again May 5th, two weeks after airplane spraying. Full grown larvae were collected in three spots in Goode Canyon and one in Salisbury Canyon, within the treated area. All of these spots were close to steep banks where it would appear that the plane had failed to give complete coverage. The largest of these spots was hardly more than one-half acre. No larvae were taken in five other fields inspected at this time within the infested area, nor were any taken in intensive sweeping of the wheat fields in the Cuyama, and neighboring localities in Santa Barbara and Kern Counties, outside the infested area.

In order to detect possible presence of wheat sawfly in other areas, spot inspections were made during April by state and county inspectors in 20 wheat fields in San Luis Obispo where 135,000 acres are planted, in 53 fields in Monterey County, 11 in Contra Costa, 13 in Madera, 24 in Tulare, seven in Kings, three in Shasta, two in Glenn, five in Siskiyou and by Los Angeles County in the Antelope Valley. No wheat sawflies were taken in any of these areas. Ventura County made inspections in the Cuyama Valley district of that county and San Luis Obispo County continued very extensive inspections in the Carriso Plains where 72,000 acres were planted to wheat, separated from the Cuyama infestation only by a low mountain barrier. No signs of wheat sawfly were found.

Yellow Clover Aphid, *Therioaphis myzocollis*: On February 4 a collection of aphids was made from bur clover growing in a residential locality in San Diego by an entomologist of the Bureau of Plant Quarantine. Submitted to Sacramento, they were identified as the yellow clover aphid. This is the first record of the species in California. Known for many years in the eastern states as a minor pest of red clover, there seemed no reason to anticipate it would become a serious pest in California. In fact it was reported at one time that bur clover and alfalfa were not hosts. However, early in the summer enormous populations of this same insect

appeared in Arizona, New Mexico and Imperial County, California. Similar populations appeared in the Palo Verde Valley of Riverside County in May and again in October. It appeared in the Hemet and Perris localities in October. The San Bernardino County Agricultural Commissioner reported it in Mojave Desert localities during November. In December it was found both by the commissioner at Santa Ana, Orange County and the commissioner's office at Lancaster, Los Angeles County.

The sudden appearance of this insect in such tremendous numbers over a wide area is unusual and difficult to explain on the basis of present information. There is no evidence that it was present in the desert regions of California prior to the present season. It might have been present during the previous year in San Diego. Some taxonomic authorities have considered that this same insect occurs in Europe and Asia under other names, although food plants reported in the different regions would suggest additional study is necessary to determine true identity of the insect involved. Alfalfa is the reported host of the insect occurring in India. Spot surveys in alfalfa in several San Joaquin Valley counties and in Northern California counties during this summer failed to indicate presence of this insect.

Avocado Rust Mite, *Calepitrimerus muesbecki*: This insect was first collected in California by an entomologist of the University of California, Riverside, in an avocado planting near Ventura, Ventura County. It was found on trees which had received sprays for mites. Additional collections made by the commissioner's office in April permitted definite determination as a species previously known only in Florida.

Inspections in eight orchards in Santa Barbara County during May, by one of the survey entomologists in company with a Santa Barbara County inspector, located a few infested trees in one orchard near Carpinteria. The infested avocado trees, in this case, were growing interplanted with lemon trees to which a miticide had been applied. Survey in other Southern California counties has so far failed to indicate presence of this mite; however, on the basis of observations in Ventura and Santa Barbara, it would seem this insect is probably of wide distribution but ordinarily in such low populations that it is difficult to find.

Evergreen Bagworm, *Thyridopteria ephemeraeformis*: Collections of the evergreen bagworm from Lancaster by the Los Angeles Agricultural Commissioner is the first record for this species in California. Infestation was found on a single residential property. The bags were carefully hand picked and the infestation is believed to have been eliminated. Area surveys by state-county personnel in the vicinity of this infestation failed to show any other indications of its presence.

Cherry Fruit Fly, *Rhagoletis cingulata*: In cooperation with the counties, 72 sticky carbon traps baited with ammonium carbonate were placed in each of the major cherry producing counties, San Joaquin and Santa Clara. Twenty-five each were placed in cherry orchards in Alameda, Solano and Sonoma Counties. The traps were sent at the end of the season to Sacramento for examination by the taxonomic staff. No cherry fruit flies were taken.

Pear Psylla, *Psylla pyricola*: Inspection made for this insect on pear trees in Humboldt, Lake, Mendocino, Placer, Shasta and Trinity Counties failed to indicate spread of this insect from infestations established in northern Siskiyou and Del Norte Counties since 1953. The commissioner of Humboldt County reports no infestations were found this year in the vicinity of Orick, a locality from which one collection was submitted by a plant quarantine inspector in 1953.

This is in accord with observations regarding the spread south through Oregon. In some years the insect made long jumps; in others only a slight advance would occur.

Walnut Husk Fly, *Rhagoletis completa*: On November 9 one of the survey entomologists went to Sonoma County to investigate the reported occurrence of a walnut husk fly in a small walnut orchard near Sonoma. It was found that maggots had been noticed in the walnut husks from trees in this orchard by a farm advisor from Mendocino County a month earlier in the course of a visit with the owner. According to the owner, the infestation was light and only noticed on a few of the trees. The specimens were submitted to Extension Service, University of California, Berkeley, and from there they were sent to Washington for determination. Upon receiving identification as a species of *Rhagoletis*, the Extension Service notified Sacramento.

A half hour search of the orchard in November failed to reveal any maggots in the remnants of rotted shucks under the trees or puparia in the soil, nor were any found in the shucks of a native walnut tree growing in the yard. It was then too late in the season for satisfactory survey. Since the collection appears to have been

the result of a single chance observation, it would seem likely that the flies are more widespread in that area and that an established infestation already exists. Puparia submitted later to Sacramento by the Berkeley office are considered by the taxonomists to be *Rhagoletis completa*.

Oriental Fruit Moth, *Grapholitha molesta*: First brought to the San Joaquin Valley more than 10 years ago, this insect had virtually disappeared until found causing serious loss, during July, to several peach growers in the Kingsburg area. Survey based on twig damage and collections of larvae and adults by one of the survey entomologists indicated infestation limited to within three miles of Kingsburg. Infested properties in this area were located in Fresno, Kings and Tulare Counties. Following information furnished by the Tulare County Commissioner, an Oriental fruit moth infestation was also located in one orchard three and one-half miles northeast of Exeter, Tulare County, by two state survey entomologists. The crop had been harvested, but a few scattered cling peach fruits remaining were heavily infested with small larvae. The very extensive twig damage to peach trees was comparable to that in heavily infested Kingsburg orchards. No signs of injury were noticed in seven other orchards inspected at this time in Tulare County; this infestation also appears to be very definitely localized.

Olive Scale, *Paralatoria oleae*: A well established infestation of this scale insect was found at Antioch, Contra Costa County, during May in the course of survey by a state survey entomologist and the commissioner. This is the first finding of an established infestation in the San Francisco Bay region.

European Clover Seed Weevil, *Miccotrogus picrostris*: This introduced pest of clover seed was found for the first time in Plumas County in the course of survey by the commissioner and one of the state survey entomologists. This is a considerable movement since 1950, when it was first found in Siskiyou and Modoc Counties. It was taken in Cottonwood in Shasta County, during 1952, but has not yet been found in the Sacramento Valley south of this point.

Lesser Clover Leaf Weevil, *Hypera nigrostris*: This introduced insect can now be readily collected on red and alsike clover and sometimes on alfalfa in the northernmost California counties. It was found for the first time, June of this year in Plumas County, in the course of survey by the commissioner and a state survey entomologist. It has been collected in previous years in Placer County but not as yet in the Sacramento Valley.

Cabbage Seed Pod Weevil, *Ceutorhynchus assimilis*: Since first reported in the San Francisco Bay area in 1945, this insect has spread to most of the central coastal counties. While a serious pest of seed cabbage and related plants, spread in California has been largely due to infestations in wild mustard. A collection made in Calaveras County, in June, is a first record for that county and only new locality recorded this year.

Rice Leaf Miner, *Hydrellia griseola*: Observations made in Fresno, Merced, San Joaquin, Stanislaus, Sacramento and Yolo Counties during May and June all indicated extremely low populations of this insect in rice.

ERADICATION OF INCIPIENT INFESTATIONS OF NEW INSECT PESTS

MEREDITH JONES, *Economic Entomologist*

A number of major insect pests of important agricultural crops are the subject of eradication measures designed to eliminate incipient infestations restricted to localized areas within California. Each project is under the direct supervision of a resident state entomologist in the area concerned. In general the plan of operation involves the application of remedial measures to all hosts within an area defined to assure that all existing infestation is included. Such measures are applied seasonally, with due regard to the host and pest concerned, over a period of three consecutive seasons followed by intensive survey over another three seasons to detect any survivors. If during this period any survivors are found, the full program is reinitiated with that finding. Such projects once established, therefore, require a minimum of six years for their accomplishment; they may, and have on occasion, required much longer periods of operation to attain the objective. Those pest species now receiving such attention include the following:

Mexican Bean Beetle, *Epilachna varivestis**: Measures directed toward the eradication of this serious pest of beans in which known infestation has been restricted to Ventura County, have been under way since 1946. Following the suppression of major infestations in 1946 and 1947, findings have consisted of a few infested plants on one or two properties each season up to 1950. In each of these latter instances immediate hand picking and destruction of insect specimens was followed by pulling and burning of infested and adjacent plants and dusting with 1 percent rotenone of all host plants within 50 feet. Within the next 24 hours the entire property, regardless of size, was then treated. Within 72 hours all plantings within a one-mile radius were similarly dusted; semimonthly applications were made for the remainder of the season and for the next two crop years. At no time was any recurring or new infestation found in areas so treated.

A series of three such yearly treatment programs, followed by two consecutive seasons of survey inspection, has been made since the last live specimen was found in 1950. In view of established eradication policy, completion of one more survey season with continued negative results will result in successful termination of this eradication effort.

Bean plantings in Ventura County, estimated at 40,000 acres, were again divided into intensive inspection and scouting areas for survey purposes during 1954. All previously infested and adjacent plantings were inspected three times at 12-row intervals; more distant acreage received a single inspection at 24-row intervals. In addition to field inspections, all yard plantings in the vicinity of formerly recorded infestations were checked twice, and spot checks of all vining stations were made during their operation.

Forty-eight state and county inspectors, working in five-man crews each headed by a crew leader, spent 13,572 and 4,596 man-hours respectively in the survey and resurvey of 87,438 acres and 1,288 yard plantings, during 1954.

Western Grapeleaf Skeletonizer, *Harrisina brillians*†: The suppressive measures directed against the western grapeleaf skeletonizer, *Harrisina brillians*, during the 1954 season were expended for the most part in the northern and northwestern areas of infestation. Primary work centers were east of Anza, Riverside County,



Avocado seed weevil (*Helipus lauri*) found associated with avocado seedlings grown from imported seed on the University of California campus, Los Angeles, and given immediate eradication attention.

* Ted Gallion, Entomologist in Charge.

† Alan Forbes, Entomologist in Charge.



Top left, reading down: Pear psylla eggs at base of fruit spur on pear (Cornell University photo)—Adult Mexican bean beetles (*Epilachna varivestis*), under eradication in Ventura County —Fork coated with oil, used in determining presence, stage and number of beet leaf hoppers on range Russian thistle host—Pear psylla (*Psylla pyricola*) on stem of young pear tree—the psylla was recently found in northern California. (Cornell University photo). Top right, reading down: Hall Scale (*Nilotaspis halli*) on almond, highly magnified—Inspector J. H. Admondson, of Hollister, San Benito County, inspecting a neglected diseased apiary—Typical yard scene involved in fumigation of host trees, under state-federal eradication project directed against Hall Scale (*Nilotaspis halli*) in Butte and Yolo Counties.

and east of Rincon, San Diego County, where the northern extremes of infestation were found in 1953.

Horsechief Canyon in the northeast sector of operations, due to its inaccessibility, did not lend itself to repeated insecticidal treatments. Accordingly preparations were made to eliminate wild host vines through the application of herbicides. Helicopters were used in locating suitable landing sites which were marked by dropping small bags of titanium oxide from the air. Foot crews later moved in to clear the chosen "heliports"; 500 pounds of miscellaneous equipment, including specially developed portable power sprayers, and 1,010 gallons of diesel-herbicide were flown in to eight such locations along the length of the canyon. Crews were flown in with camping equipment. Ten men completely sprayed out the canyon and its tributaries in a 30-day period, moving their camps progressively eastward. During the first spraying, 1,392 gallons of diesel oil fortified with 2,4-D, 2, 4,5-T, were used on an estimated 8,352 square yards of wild grape. Resprayed in June and again in August, the 95 and 10 gallons used respectively is evidence of the efficiency of the initial operation. A few small patches of vines were deliberately left as a trap crop, and later destroyed.

On the northwest periphery of operations, infestation found in the San Luis Rey River area in 1953 were such that insecticide treatments could be applied. Trails built into the canyons involved, in the fall of 1953, facilitated this effort. DDT dust was heavily applied on two occasions. Light infestations reported prior to such treatments were not in evidence at the season's end.

In agreement with the biological control program of the University of California, the area south of the San Diego River and a line extending northeast to Coyote Creek was reserved for parasite release and buildup. Insecticidal treatment of both wild and cultivated grapes north from this boundary to the peripheral treatment area, was carried on throughout the season. Canyon dusting of wild grapes began in May. Two applications to cultivated host vines were completed by mid-August. 10,680 pounds of cryolite and 2,400 pounds of DDT were used in treating an estimated 330,867 square yards of wild vines, 21,437 backyard host plants and 291 acres of commercial plantings.

Surveys of both wild and cultivated vines accounted for a large segment of project activity during the season. Palm Canyon, along the southeastern drainage pattern of the San Jacinto Mountains of southern Riverside County, was checked continually until mid-September. A light infestation in its southernmost tributary was found in July. This infestation, should it expand northward into a continuing series of inaccessible canyons, may become uncontrollable.

The logistics of equipment, material and manpower supply for this one infested canyon alone will require expenditures equivalent to the present budget total. To the south and west other drainage patterns were kept under observation. Two new infestations were found in tributaries of the San Luis Rey River, northwest San Diego County, extending the insect to the northeast of the original outbreak here. Aerial surveys by helicopter allowed for general roughing in of wild grape distribution and assignment of follow-up ground surveys.

Inspections of cultivated vines was a continuing operation from June into October. No infestations were found within range of peripheral surveys extending in an arc from Escondido through Hemet to the Coachella Valley. To the south infestations were located in the Jacumba area within five miles of the Imperial county line and less than a quarter-mile from the Mexican border.

A total of 9,493 acres, and 1,203,552 square yards of wild vines in 784 sections were surveyed during the year, accounting for 9,040 man-hours and 45,730 vehicle-miles.

Major strides were reported by the Department of Biological Control, University of California, in their parasite release and field study activities. The 1954 season was characterized by a further drop in the number of infestations in the biological control area despite the cessation of chemical control. By fall infestations had disappeared completely in ten of the canyons listed as infested in 1952 and declined to unusually low levels in most of the others. Parasitism in wild grape averaged 62.2 percent during 1954 as compared with 41.4 percent in 1953. The incidence of the fly parasite, *Sturmia harrisinae*, was eleven times that of the wasp parasite, *Apanteles harrisinae*. A surprising recovery of *Sturmia* was from a Borrego Valley canyon representing natural dispersal of at least 20 miles.

Experimental vineyard studies revealed higher *Apanteles* incidence except where sulfurizing is practiced. *Sturmia*, in contrast, does not appear to be adversely affected by sulfur. Cryolite has proven highly toxic to both species.

A granulose virus disease is apparently becoming a definite lethal factor in the field to any immature stage of the skeletonizer, including egg, larvae, or pupae, irrespective of season or host density. Another significant fact is that *Sturmia* can apparently transmit this virus.

Analysis has shown a common sequence during the past four years: namely, moderate to high skeletonizer populations; presence of the granulosus virus; parasitism attaining a minimum level of 65 percent; and decline to low level of skeletonizer infestation.

Citrus White-Fly Eradication (*Dialeurodes citri*): The present treatment area is now confined to the City of Madera, Madera County. This area embraces 26 city blocks as originally infested, together with 52 periphery blocks included as a buffer zone around the infested blocks. Both pre-spray and post-spray inspections during 1954 failed to show any survivors.

This application completes the second in a series of three annual treatments since the last finding of live white fly. In the event subsequent inspections are negative, the final spray treatment is scheduled for 1955. During 1954, 66 sprayer hours and 4,400 gallons of spray material were required in carrying out the spray program. The material used consisted of one and two-thirds gallons light medium oil in 100 gallons water applied as a full cover spray in February, at which time all infestation is in the larval or quiescent stage. The County Agricultural Commissioner, Madera County, contributed the services of two men for both inspection and spraying functions.

An infested area in Fresno County, found in 1950, still requires one more survey, following the original three-year treatment, before being eligible for final release.

All other infested areas have been released following a three-year treatment and a three-year survey.

Cherry Fruit Fly Eradication (*Rhagoletis cingulata*)*: The fourth season of cooperative state-county effort toward eradication of incipient cherry fruit fly infestations in western Siskiyou County in domestic cherries has been successfully completed. The 1954 season represented the final treatment year of the original and extended infestation areas along the Klamath and Scott Rivers; no live insects were found. Surveys will continue for three years to substantiate eradication.

The four-year program has included seasonally applied measures involving (1) host tree and seedling removal, (2) host fruit destruction, (3) soil toxicant application, (4) host tree cover spraying and (5) survey inspections.

In order to lighten the treatment load and give greater assurance of ultimate program success, continued effort has been given to the removal of abandoned or unwanted backyard host trees and to the destruction of all seedling hosts within a two-mile radius of properties recorded earlier as infested. Four trees and 166 seedlings were so removed during the 1954 season; total removals to date are 530 trees and 4,068 seedlings. To prevent regrowth, stumps are painted with a 2,4-D and 2,4,5-T mixture combined with diesel oil. The less than 250 remaining trees subject to treatment were scattered in two's and three's over many widely scattered properties. No commercial plantings are located within a hundred miles of the treatment area.

Elgetol (19 percent sodium dinitro-ortho-cresolate), at one quart in 100 gallons of water, was again used to inhibit fruit production. This mixture, which acts as a pollenicide, was applied one to four times during the blossom period. Subsequent results, combined with the effects of subsequent frost, gave a reduction in fruit set of 80 to 85 percent. The remaining fruit, having served as a trap crop was hand picked and destroyed prior to the time that any maggot emergence might occur.

Soil toxicant materials have progressively changed, influenced by research work conducted in the Northwest. Last season dieldrin was substituted for benzene hexachloride; a change recommended by results of preliminary studies by these workers. Based upon further studies indicating 100 percent control of the cherry fruit fly, isodrin was used at the rate of four pounds actual material per acre. Applied at the rate of one gallon per square yard (one pint of 19 percent isodrin per 100 gallons water), soil under host trees on infested and adjacent properties was saturated to a depth of six inches. These same measures are also applied in the vicinity of seedling clump removals.

At weekly intervals throughout the fruiting season regular methoxychlor cover spray applications were made to all host trees and shrubbery within two miles of a recorded infestation. Eleven such treatments were made using three pounds of 50 percent wettable methoxychlor per 100 gallons of spray. Build-up of the black cherry

* Dan Robinson, Entomologist in Charge.

aphid made remedial measures necessary in part. The addition of benzene hexachloride, at the rate of 1.25 pounds of 10 percent gamma isomer per 100 gallons, to the regular mixture afforded some relief.

Early survey effort was directed toward adult trapping. As in the past, quart-size cartons with the inside surfaces coated with a sticky compound, were hung inverted in host trees and baited with two-ounce packets of powdered ammonium carbonate; 173 such traps were serviced, one on each host tree at infested and adjacent properties and others on selective hosts as far as four miles distant. As fruit ripened, more and more effort was given to larval inspections. A hot water flotation method, involving crushing of fruit and immersion, was utilized for examination of more than 400 quart samples of host fruits, nearly one-fourth of which represented trap crop samples from within the treatment area; the remainder was collected from adjacent localities within a 100-mile radius. In the course of this work, July 5 a single second instar maggot was recovered from a property in Yreka, nearly 20 miles from the nearest previously known infestation. Additional small amounts of host fruit remaining in the area were collected and examined; soil sifting surveys were continued in the vicinity of the original collection to further delimit the extent of infestation despite the lateness of the season. No additional specimens were found.

A survey of the Yreka area revealed 160 host trees on 105 properties. Soil toxicant was applied beneath 26 host trees within a quarter-mile radius of the maggot find, and the entire host complement was given a precautionary methoxychlor cover spray. Scouting crews turned up only two small seedlings in uninhabited areas within a two-mile radius. Bitter cherry, *Prunus emarginata*, was found no closer than three to four miles distant at elevations above 4,500 feet.

In continuing the project during the 1955 season, survey activities will be carried on by the State in both the Yreka and down-river sectors of operation; treatment applications in Yreka will be handled by the office of the agricultural commissioner using state equipment and materials.

Mexican Fruit Fly, *Anastrepha ludens**: An event of major significance to California agriculture was recorded on January 22, 1954, when, during the course of routine pest survey along the international border, Baja California, Mexico, an inspector of the United States Department of Agriculture trapped an adult female Mexican fruit fly, *Anastrepha ludens*, just four miles south of the California line.

Based upon the assumption that an established infestation might exist within flight range of susceptible California citrus and deciduous host fruits, immediate action in the form of a cooperative protective program was inaugurated. Parties to this joint effort were the Departments of Agriculture of Mexico, the United States, the State of California and San Diego and Imperial Counties. Program activities included surveys, treatment applications and reinforcement of guarding quarantines.

Bait trapping, soil sifting and fruit cutting inspections were organized early in February on both sides of the border. This program was progressively and rapidly enlarged to cover northern Baja California and Hermosillo, Mexico, and all of southern California. After initial federal and state assistance, Riverside, San Bernardino, Orange, Los Angeles, and Ventura Counties assumed responsibility for the continuing work within their boundaries. Their contributions persist as a secondary line of defense behind the more intensive inspection efforts of federal, state and county personnel in San Diego and Imperial Counties. At the end of the year three full-time federal inspectors were assigned to San Diego County, one to Imperial County and a fifth based at Yuma, Arizona, assigned to the Bard Valley of Imperial County and to adjacent portions of Arizona and Mexico. A total of 2,729 traps on nearly 700 properties are being operated by these forces in California. Other federal personnel, in collaboration with Mexican authorities, have extended surveys in lower California to Tijuana, Ensenada, Tecate and Mexicali.

Trapping techniques closely parallel the methods developed by the United States Department of Agriculture in the Rio Grande Valley of Texas. Standard glass McPhail traps are baited with a mixture of brown sugar, five pounds, and water, 20 gallons, hung at head height in suitable host trees, and serviced once or more each week.

On April 9, 1955, when a second fly was trapped in Tijuana, Baja California, it was decided that protective bait spray applications should be made there and, to prevent the possible northward flight of other undetected flies, along a five-mile strip of San Diego County just north of the border. Spraying was commenced on the California side of the line on April 15. Initially augmented by federal and county equipment and personnel, state rigs and crews have since taken over this phase of operation.

* Alan Forbes and Cyril Gammon, Cooperating Entomologists.

Three 150-gallon power sprayers mounted on one-half ton pickups together with five-gallon knapsack sprayers as auxiliary equipment serve the San Diego area. Spray formulas have consisted of four pounds tartar emetic, 20 pounds granulated white sugar, and 100 gallons water. Sprays are applied as an atomized stream to the interior portion of each host plant and to selected under-surface portions of the tree exterior. Application timing has been based upon 21-day intervals. A total of 14 such applications were made over the 180-square-mile protective zone measuring 30 miles inland and some six miles northwards from the border. Nearly 20,000 host trees on some 2,400 properties were treated per application for a grand total of 228,079 host treatments; 53,198 gallons of spray, averaging .233 gallons per tree, were used.

A female fly was trapped on June 14 in Mexicali, Baja California. On this basis a comparable spray program was initiated there and over a 110-square-mile area surrounding Calexico in Imperial County. A 400-gallon bean sprayer has been used for six treatments of dooryard plantings totaling 27,720 and 15 citrus groves totaling 610 acres covered each time by contract aircraft. A more concentrated spray formula (1-5-10), at the rate of 10 gallons per acre, was applied to this commercial acreage. In view of the Texas experience showing lethal effects of high temperatures during the summer months, treatments were discontinued during late July, August and September and resumed in October with the advent of more favorable conditions.

The first and only Mexican fruit fly specimen collected in California to date was taken August 9 in the town of San Ysidro, San Diego County, just two miles north of the international border. An eradication area was proclaimed by the director to allow for application of more drastic treatment measures to all host trees within one mile of the property on which the fly was taken. Trapping was intensified in this area, both as a means of fly detection and as a supplement to other eradication processes, 722 traps on 246 properties are being serviced by state personnel. This area lay within that already being sprayed. In addition a fruit examination and sanitation program was developed. All fallen or prematurely colored host fruit has been gathered at regular intervals, examined for larval infestation, fumigated and buried. Nearly 1,800 pounds of miscellaneous fruits have been so destroyed since the program was put into operation. Supplementing the regular bait spray program the soil under all host trees within a quarter-mile radius of the trap location where the fly specimen was collected, was treated with isodrin at the rate of four pounds actual material per acre. These measures sought to prevent entry of any mature larvae into the soil for pupation, survival of puparia, or late emerging adults.

Fruit fly collections in Baja California were made at nearly weekly intervals during June, July, August and September, tapering off in October to a single collection recorded in November. A total of 10 male and 17 female Mexican fruit fly adults were taken below the border during 1954. Of these, 25 adults and the puparia were collected in the Tijuana area, one adult in Mexicali and one in Ensenada. As finds were made in new areas, bait spray applications were expanded to include them. No larval infestations have been reported in locally grown host material, although heavy larval populations were recovered from mainland grown mangoes found on Tijuana and Mexicali retail markets during May. Cooperative quarantine arrangements between the United States and Mexico Departments of Agriculture are aimed at the prevention of further shipments of this type except under authorized treatment procedures. At the same time, the strengthening of United States Department of Agriculture border quarantine forces and the promulgation of a California interior quarantine regulating the movement of host fruit from the San Ysidro area provide even further assurance that infested materials will not gain entrance to or become distributed in other California locations.

Other than the fly trapped at San Ysidro August 9, no flies have been taken on the California side of the border nor has any fruit infestation been found.

Hall Scale, *Nilotaspis halli**: This cooperative federal-state eradication project was first initiated in 1941. Over the years progressive host tree surveys have revealed the presence of this serious scale pest of almond and stone fruits in five localized areas in and around the City of Chico, in one area within the City of Oroville, Butte County, and within the City of Davis, Yolo County. No other western hemisphere establishment is known.

To date a total of 42,688 host trees have been included in the treatment areas now defined by a one-half-mile radius from a known infested property; 21,706 of these have been given three annual fumigations and 12,773 unwanted or abandoned trees removed. Eradication measures in three separate local infested areas

* E. H. Fosen, U. S. Department of Agriculture, in Charge.

in Chico have been completed and these areas removed from the treatment program. Of the remaining 8,209 host plants in four infestation areas, 7,009 trees have been fumigated twice and 1,200 trees once with respect to three planned annual fumigations. Barring the discovery of survivals or of new infestation, the project's treatment phase is scheduled for completion in 1956. Three subsequent years of survey with negative findings will follow to substantiate these results.

The 1954 fumigation season covered the period October through December. During this period 10,815 orchard and dooryard trees on 860 properties were fumigated using 35 cc HCN per hundred cubic feet under gastight fumigation tents; exposure time was 50 minutes. Six fumigation crews, employing a peak of 46 seasonal state employees to augment the regular federal staff of the project, were used. Extremely favorable weather permitted 64 actual fumigation days out of 71 possible days of operation. A total of 21,222 pounds of HCN was used for an average of 1.96 pounds per tree. All host trees within a 2,500-foot radius of known scale infestations are included in the treatment program.

There are 111 plasticized nylon fumigation tents currently in use on this project ranging in size from 20 to 85 feet in diameter. As a check on the gas-tight quality of the tents and upon operational techniques, gas samples have been drawn at regular intervals and analyzed chemically by titration. Average concentration readings were well in excess of that adopted as insuring effective mortality of the scale.

Removals of abandoned or unwanted host trees, accomplished through grower cooperation, have materially reduced the number of hosts subject to fumigation; 2,527 trees were removed during 1954. In addition 903 volunteer seedling hosts in slough areas and other noncultivated lands adjacent to infested areas were destroyed. The removal of a total of 12,773 host trees during the life of the project represents a saving of over \$385,000 in fumigation cost. They comprise approximately 30 percent of the host trees included in the treatment program.

Inspection and scouting phases of the project continued throughout the spring and summer of 1954. Intensive inspections were devoted primarily to the continued tree-by-tree examination of host trees just outside the half-mile radius of treatment in all areas to assure, if possible, that the measure used was adequate. A total of 48,539 trees were thus checked during 1954 on 2,096 properties. A more rapid "walking survey" of plantings some distance from known infestations covered 27,578 hosts on 389 premises in the Chico area. Even more distant scouting surveys in other portions of Butte County, Yolo and Solano Counties added another 19,528 inspections on 532 properties. With one exception, survey of 95,645 trees on 3,017 properties showed no new Hall scale infestations.

The exception referred to involved the finding of a very inconspicuous heavily infested plum seedling on a Bidwell Park property at Chico which was completely hidden by other dense shrubbery and thus escaped detection; 1,200 host trees within a 2,500-foot radius of this finding were immediately brought under treatment and will continue so for another two years. Otherwise, the progress being made in this important pest elimination effort looks very encouraging.

REGULATORY CONTROL PROJECTS

MEREDITH JONES, *Economic Entomologist*

Certain major insect pest species, because of their migrating habits, present problems in control not amenable to individual grower effort. In such instances infestation originates on the property of individuals not concerned with their presence or control. Obviously no individual has the right to enter private property of others to effect control, and it can only be accomplished by a regulatory agency. Species involved in such action are those which move in numbers to other agricultural areas and do damage to high value crops. The following insect control projects fall in this category:

Sugar Beet Leaf Hopper (*Circulifer tenellus*): * Fall-winter-spring controls over native host areas of the leaf hopper have resulted in holding population reductions well below the level of economic damage. A series of three surveys during the growing season, using "curly-top" susceptible tomato fields as a yardstick, revealed less than one percent virus damage in any one county. This com-

* Harold Green, Entomologist in Charge.

TABLE I

County	Winter 1/4-2/4	Spring 4/12-4/22	Russian Thistle 10/5-11/1	Perennials 11/1-11/22	1954 total
Fresno	3,293	385	19,342	7,156	30,176
Kern	-----	7,717	128,094	-----	135,811
Kings	-----	-----	24,146	-----	24,146
Merced	-----	-----	-----	175	175
Monterey	-----	-----	-----	90	90
San Joaquin	247	-----	-----	991	1,238
San Luis Obispo	40	-----	1,021	-----	1,021
Stanislaus	49	-----	-----	75	124
Totals	3,589	8,102	172,603	8,487	192,781

pare favorably with the low incidence of infection maintained since the inauguration of the Russian thistle aerial applications in the fall of 1950.

Four carefully scheduled spray campaigns are basic to the maintenance of these favorable conditions. They involve the treatment of Russian thistle in the early fall before the summer populations of leaf hoppers have a chance to move into the foothills for the winter; the spraying of brushy perennials in the approaches to the foothills in late fall; the spraying of winter annuals in canyons and lower foothills adjacent to agricultural areas during the winter and again in the spring to reduce further the number which otherwise might find their way back into agricultural areas, carrying the virus with them. During the summer as many as four generations of the leaf hopper may develop on the principal summer host plant, Russian thistle.

During the 1954 season a total of 192,781 acres of summer and winter open range host plants in eight San Joaquin Valley counties was sprayed, using one pound of actual DDT in two gallons of diesel oil per acre. Table I summarizes these operations by county.

During the fall of 1953 nearly 230,000 acres of thistle and perennials were sprayed. Winter, 1954, concentrations of leaf hoppers were first treated from Tracy south to Coalinga. Heavy rainfall north of Coalinga resulted in dense vegetative growth unfavorable to the leaf hopper. However, to the south along the western side of the valley vast areas suitable to spring reproduction developed. If earlier controls had not reduced over-all populations to a minimum, damaging numbers of the leaf hopper could have resulted in this extensive area. The first

TABLE II

District	County	Acres cut	Acres 100%	Miles road	Miles ditch	Man hours worked
1	Alameda	-----	-----	42.3	-----	59
1	San Joaquin	3,929	246.34	371.7	59.5	3,551
1	Stanislaus	371	22.71	304.3	66.7	546
2	Merced	6,788	137.80	94.8	44.3	3,540
2	San Benito	133	3.30	51.6	1.2	234
2	Fresno	10,381	398.70	144.6	14.0	5,543
3	Fresno	1,038	130.2	714.0	26.0	3,437
4	Kern	4,292	203.50	848.6	25.7	3,436
Season totals	-----	26,932	1,142.55	2,571.9	237.4	20,346

TABLE III

District	County	Gal. spray	Qt. sinox	Acres sprayed
1	San Joaquin	2,800	28	192
3	Fresno	1,300	13	83
4	Kern	1,400	14	114
Totals	-----	5,500	55	389

spring nymphs were found February 24, but it was not until April that concentrations warranting spray application were found. Drought conditions prevailing throughout this period were followed in mid-April by early adult migrations, into the valley, of those few leaf hoppers surviving the fall and winter operations. By early May a survey of spring breeding grounds revealed that flights had been completed. A check of summer thistle in the valley areas gave low counts ranging from one leaf hopper for each 10 net sweeps, in the Bakersfield area, to less than one per 25 sweeps in the Modesto area. June surveys of beet fields in the San Joaquin, Sacramento, Salinas and Santa Clara Valleys showed negligible population totals. Virulence tests of insect infectivity during 1954 were found to range from 3 to 12.7 percent; this compares to the 1953 percentage range of 8.9 to 53.1.

Sixty-three plantings of early tomatoes, used as a yardstick in measuring the effectiveness of the control program because of their high susceptibility, were checked for "curly-top" early in May, from Tulare County north through Merced County. They showed less than 1 percent damage in any one field. Second and third surveys of these same fields in June and July revealed no increase in disease. June inspections in Ventura, Monterey, San Benito and Santa Clara Counties which are protected by this control program gave damage averages of less than 1 percent disease. During July fields from Stanislaus north through Colusa gave similar readings. Prior to establishing this control program in 1950, annual disease expectancy averaged 20 percent throughout the problem area.

A summer phase of the control program includes removal where practical or reduction of Russian thistle acreage as a summer open range host. Five districts have been organized for this purpose and crews ranging from 2 to 15 men assigned to the destruction by hoeing of scattered plants and small stands along ditch banks, roadsides and in rangelands where 100 percent cleanup is possible. Reduction of such patches of thistle prior to fall seeding tends to restrict outward spread of thistle stands the following seasons. Clean areas were maintained this year from the Altamont Pass south to Big Panoche Canyon and from cultivated areas to the foothills. From the Panoche area south to the Edison Hills more localized free areas were maintained. Some spraying, using special chemicals such as Sinox or diesel oil, was also employed where thistle is small and difficult to hoe. Tables II and III summarize these activities for the 1954 season.

Rapidly maturing thistle plants made possible the initial mapping of thistle acreage, by the latter part of June. Repeated use of a helicopter facilitated the rapid and accurate survey of the extended area involved. More than 200,000 thistle acres were recorded, nearly three-fourths of which were in northwest Kern County. Rapid drying eliminated part of this total prior to treatment. Treatment waivers to permit spraying were obtained from property owners concerned; construction of temporary landing strips for planes was completed, and early fall operations began October 6.

Four planes using a total of 23 landing strips, covered a total of 168,753 acres during the ensuing two-week period; 337,506 gallons of DDT-diesel oil were applied in 100-foot swaths, from an elevation of 25 feet. A limited amount of groundrig spraying supplemented this work in marginal areas and in other areas inaccessible to aircraft application. Post spray counts taken at intervals of 1, 2, 7 and 14 days, to check control results showed an average of 99 percent kill in all areas. Table IV summarizes this work.

The late fall perennial spraying, involving principally *Atriplex polycarpa* and *Lepidospartum*, covered an additional 8,487 acres in five counties and caught leaf hopper concentrations which had escaped from the earlier treatment. This operation concluded the 1954 treatment season.

During the year a number of surveys were made in areas outside of the general control area, in Ventura, Los Angeles and Imperial Counties. Only in the Antelope Valley, Los Angeles County, were numbers of any significance recorded, and even here counts never exceeded seven leaf hoppers per net sweep.

In conjunction with the University of California at Riverside, radioactive phosphorus marking of leaf hoppers was initiated as a test to determine more accurately the direction and extent of the leaf hopper's spring flight. It is anticipated that by the spring of 1955 major releases of marked leaf hoppers will be made and follow-up studies prepared.

The university has continued its release of egg parasites of the beet leaf hopper, as shown in Table V.

TABLE IV

County and area	By airplane	By state rigs	County totals
Fresno County:			
Coalinga Nose.....	14,171	3,250	
Big Panoche.....	1,821		
Murray.....		300	19,342
Kern County:			
Famoso.....	6,200		
Wheeler Ridge.....	1,625		
Gardner Field.....	3,846		
Minter Field.....	1,450		
Belridge.....	12,431		
Lost Hills.....	27,948		
Junction Pump Station.....	40,593		
Blackwell's Corner.....	11,034		
Keck's Corner.....	1,621		
Tembler Pump Station.....	21,046		
Edison Hills.....		300	128,094
Kings County:			
Avenal Gap.....	18,546		
Kettleman Hills.....	2,900		
Milham.....	2,700		24,146
San Luis Obispo County:			
Carriso Plains.....	1,021		1,021
Grand totals.....	168,753	3,850	172,603

Grasshopper Control*: Protection of high value cropland from grasshoppers, originating in adjacent rangeland breeding grounds, was again necessary during 1954. Alfalfa, clover and mixed pasture also required protection from species indigenous to areas where these crops are of major concern.

Arid climate and low rental value of rangelands in general make controls over such lands economically unfeasible. Exceptions to this are found in the naturally subirrigated Sierra Nevada mountain meadow areas and in the lush coast ranges.

Basically, however, the effective control consists of detecting and reducing nymphal populations on marginal lands before serious migration to adjacent cropland can take place. At the state level only under emergency situations are grasshoppers classified as other than any other regular insect pest for control purposes. Responsibility for treatments is thus placed directly upon the crop owner. Because of the nature of the insect, however, regular assistance is given in such ways as anticipating outbreaks through survey and observations, advising with and organizing community effort and directing the control programs so established. All such contributions are provided through and in conjunction with the staffs of the county agricultural commissioners. During past years, and particularly in 1954, the United States Department of Agriculture Grasshopper Control Project through the services of its district leader, has been prominent in supervising these activities.

No major changes in the distribution of grasshopper species in California was evident during the 1954 season. On a state-wide basis the devastating grasshopper, *Melanoplus devastator* was again the dominant foothill species, with the valley grasshopper, *Oedaleonotus enigma*, intermixed in localized areas and the clearing grasshopper, *Camnula pellucida*, predominating at higher elevations. Crop species included *Melanoplus mexicanus* in the Imperial and Palo Verde Valleys, and *Melanoplus marginatus*, *Melanoplus femur-rubrum*, *Melanoplus differentialis* and *Camnula pellucida* in other valley and mountain regions.

Grasshoppers were definitely reduced in Southern California and in the southern San Joaquin Valley during 1954. However, they either maintained their 1953 density or increased to outbreak numbers in the northern San Joaquin and in the Sacramento Valleys. Drought conditions during 1953, which resulted in unfavorable range feed and egg laying conditions in Southern California are believed responsible for the 1954 reductions in numbers in that area.

* Sam S. Smith, Entomologist, United States Department of Agriculture.

Mormon crickets were not a factor in the control picture, as they were in 1953 along the California-Nevada border in Lassen and Modoc Counties.

Grasshopper control programs of significance were carried out and financed by growers in 20 counties during 1954. A total of 102,627 acres (55,426 acres of rangeland and 47,201 of cropland) was treated; 32,005 acres were sprayed, 1,750 acres dusted and 68,872 acres baited. Most intensive control applications were required in Tehama, Butte, Madera, Fresno, San Diego and Imperial Counties.

An increasingly greater portion of all controls was accomplished by aircraft application. Reductions in cost per acre of both materials and application thus influenced a more extensive coverage. Aldrin was the most commonly used spray toxicant; chlordane, heptachlor and dieldrin also gave excellent results. Toxaphene was popular where seed crops and bee culture were involved. More than 40,000 pounds of these materials were used.

In some areas large quantities of bran bait continued to be used for various reasons: (a) in coordination with cultural practices, as in the Imperial Valley; (b) for strip baiting, as in Tehama County where longer lasting barriers to nymphal migrations were necessary; (c) in the treatment of terrain too rough to be effectively covered with spray; and (d) as packaged and made available for the protection of home gardens.

It is estimated nearly 350,000 acres, (150,000 acres of cropland and 200,000 acres of rangeland), were protected by grasshopper control operations. Damage estimates total \$866,000 with savings of \$2,750,000 reported.

An interpretation, that county moneys might properly be used as the state agency share in the one-third—one-third—one-third private rangeland control agreement with the United States Department of Agriculture, allows for greater financial participation in future cooperative programs. Programming in advance of actual operations is still essential, however, to make possible the commitment of federal funds. Reliance upon agricultural commissioners to improve cooperative relationships at the farmer level and inaugurate community action where needed is essential for the most effective application of controls and realization of the greatest crop protection.

SPECIAL INSECT PEST CONTROL PROBLEMS

STEWART LOCKWOOD, *Economic Entomologist*

Bureau personnel have collaborated with agricultural commissioners, university, federal and farmer participants to solve major insect control problems of growing crops, stored products and ornamental productions.

Cereal and Forage Pests

Yellow clover aphid, *Myzocallis trifolii*, was first found in California, February 7, 1954, feeding on burr clover in San Diego County. Since then it has become widely distributed over Southern California.

TABLE V

Beet Leafhopper Parasites Released From April Through September, 1954

Locality	Species		
	Polynema	Lymaenon	Aphelinoidea
California County:			
Kern	66,166	16,251	23,805
Fresno	13,600	5,970	7,800
Imperial	45,600	8,448	11,500
Los Angeles	37,200	6,550	9,000
Ventura	17,100	2,450	2,700
Riverside	700	2,000	1,000
Other states:			
Utah	20,100	4,220	12,700
Idaho	19,800	7,900	5,500
Arizona	10,000	1,150	400
Totals	230,266	54,939	74,400
Grand total of all species			359,605

By the end of the year damage to alfalfa plantings was estimated by agricultural commissioners of San Diego, Imperial and Riverside Counties to be \$337,000. Effects of aphid attack were six-fold: killing of young plantings, reduction in yield, lowering of grades, hampering of cutting and baling operations, injury to bee field forces and added control costs. Several materials were applied on a field-wide experimental basis. Parathion, two to four ounces per acre in 15 to 25 gallons of water, gave excellent control. Malathion at 8 to 12 ounces was also found effective, as was systox at four ounces. TEPP was good, toxaphene was moderate and DDT and nicotine were poor. All materials involved residual hazards and could only be applied accordingly.

In Kern County considerable ear injury to field corn was recorded during late August, caused by the corn earworm, *Heliothis armigera*, and to a lesser degree by the fall armyworm, *Laphygma frugiperda*. Inspections showed holes in foliage, through husks and into stems just below the ears.

Migrations of grain thrips, *Limothrips cerealeum*, from wild grasses to oats in Marin and Sonoma Counties occurred the latter part of May to an extent requiring application of remedial measures. Airplane application of 5 percent DDT dust at 30 pounds per acre was entirely successful in preventing damage.

In Kings County this thrip migrated to mature asparagus almost ready for harvest. Considerable feeding by adults and nymphs occurred. Tips of asparagus were whitened and withered. Nicotine sulphate spray at one quart per acre was applied but continuing damage was considerable.

A very heavy infestation of clover seed chalcid, *Bruchophagus gibbus*, was found in an Imperial County alfalfa seed crop. Hay had been cut from this field and the seed crop was late, apparently maturing at a time when adult chalcids were numerous in the area. Damage was extensive and accompanied, to a marked degree, by alternaria rot which resulted in darkened to blackish seed pods. Earlier maturing seed crops are not so heavily infested. This pest has been responsible for some curtailment of seed production. A few growers have used three applications of 5 percent DDT dust at 30 to 35 pounds per acre with reasonable success.

Cotton Insects

The two-spotted mite, *Tetranychus bimaculatus*, seemed to be the most important mite on cotton during 1954. There was an expanding use of systox in controlling this and other species of spider mites. Effective, season-long control was generally attained by one application of one pint systox in 5 to 10 gallons of water per acre. There was no reported loss of bees or livestock from the use of systox in cotton fields during 1954.

Both the two-spotted mite and Atlantic mite, *Tetranychus atlanticus*, were well controlled in a number of cotton fields by application of gas-house sulfur by airplane at rates ranging from 50 to 65 pounds per acre.

A tortricid, *Platynota stultana*, appeared in considerable numbers during August and September in Riverside County and particularly in Imperial County, where between 30 and 40 thousand acres were infested. Survey showed that in the northern part of the Imperial County cotton area infestation seemed to have reached a peak in late August. Feeding scars were more prevalent than the number of worms would account for and all worms found were fully grown. Further south, however, to the Mexican border, an increasing amount of damage occurred. Adults, eggs and very young larvae far outnumbered the fully grown worms. Many leaves were rolled and damaged. Stems of young plants were scarred. The amount of new growth on the ground indicated more than normal shedding. Flowers in some instances were webbed and rosetted, similar to the rosetting caused by the larvae of the pink bollworm.

Older bolls were found chaffed or russeted by the worms. In some instances the larvae had bored directly into the boll. Some rot was found in many of the damaged bolls. As a rule, however, over the entire county, the damage from this pest was more spectacular than actual; in a few fields actual loss did range up to 10 percent. A second inspection over the same area revealed that the infestation was much less than it had been earlier.

From 40 to 45 days are required for completion of a generation in this area. There are possibly four or five broods during the cotton growing season. Eggs are deposited as overlapping shingles on the upper surface of the foliage. Larvae, upon hatching, are more often found in the young succulent growth of the terminals.

This leaf roller has been known for a number of years as an erratic pest in greenhouses on carnations and other plants, in rose plantings and other ornamentals, and has been considered of much less importance to citrus growers than other "orange worms." In one instance it was responsible for damage to strawberry plantings in Southern California. Seldom does damage occur two years in succession.

A number of growers used varied materials in attempting to control this pest. Indications are that three sprays a week apart, using three pounds DDT per acre, are most effective. Dusting with 5 to 10 percent DDT at 30 pounds per acre was also apparently effective. Less valuable were BHC and toxaphene.

Infestations of cotton foliage by the celery leaf tier, *Udea rubigalis*, were satisfactorily checked in Kern County by dusting infested cotton fields with a combination of DDT 4 percent, toxaphene 8 percent and sulfur 50 percent, at 30 pounds per acre.

Hop Pests: During the inspection of hops, immediately prior to the application of demeton, at the rate of one and one-half pints per acre to 100 hills of hops, colonies of spider mites, *Tetranychus bimaculatus*, were found in damaging numbers on two-thirds of the leaves.

Observations for six weeks after application showed the treated block to be free from mites. Harvested hops from the treated block, tested by the Bureau of Chemistry, failed to show any hazardous residue. Similar observation where TEPP was used failed to show as favorable control results.

Deciduous Fruit Pests

During 1953 parathion was substituted for benzene hexachloride in the control of woolly apple aphid, *Eriosoma lanigerum*, in many apple orchards. Use of parathion eliminated the former hazard of objectionable odor.

An increasing number of apple growers used malathion applied at the rate of eight pounds of 25 percent wettable powder with each of three DDT codling moth sprays, using 400 gallons per acre application. Examination in late June showed not only excellent control of woolly apple aphid but of the rosy apple aphid, *Anuraphis roseus*, and the green apple aphid, *Aphis pomi*, as well.

A sudden flareup of the oriental fruit moth, *Grapholitha molesta*, in Kings, Fresno, and Tulare Counties in late season, was responsible for considerable damage to late peaches. Infested fruit was found over an area with approximately a 50-mile radius. This is the first reported damage from this species in Northern California since it was first found in the State in 1943. State, county, and university personnel are collaborating in field studies and research activities aimed at the development of effective spray schedules.

Inspections during 1954 did not give evidence of any appreciable increases of the pear psylla, *Psylla pyricola*, in Siskiyou and Del Norte Counties, or record any further southward spread. Current infestations have so far involved only individual yard trees, volunteer seedlings, neglected orchards, and in two instances, small orchards.

Damage in commercial orchards in the Medford, Oregon, area has apparently been minimized by a dormant spray application of lime-sulphur and oil followed by organic phosphate materials in addition to the usual three sprays applied for codling moth.

Three to six pounds of parathion, 25 percent wettable, per acre, in each of the three codling moth sprays did not result in any detectable host damage.

Grape Insect Pests

During the year inspections in the San Joaquin Valley tended to verify complaints of some growers that a greater number of species of grape leaf hoppers, *Erythroneura* spp., were damaging grape plantings and were surviving applications of 5 percent DDT dust. Some 10 percent dust applied at 30 pounds per acre gave better control.

Larvae of a dried fruit beetle, *Carpophilus* sp., were found in great numbers in ripe and bruised "Italia" grapes in Tulare County. A dump yard of waste fruit in the near vicinity probably aided in the increase of this pest. The refuse fruit pulp was sprayed with oil, with favorable results.

Foothill vineyards became infested with western yellow-striped armyworm, *Prodenia praefica*, by migrations from adjacent drying range grass. The application of four pounds 50 percent DDT powder in 100 gallons of water to the

bordering grass and first row or two of vines gave favorable control. Considerable loss, if not total stripping of border rows, was prevented.

Nut Insect Pests

Filbertworm, *Melissopus latiferreanus*, navel orangeworm, *Myelois venipars*, and codling moth, *Carpocapsa pomonella*, were responsible for material losses to walnut growers in Northern California during 1954. Payne, Franquette, Mayette, and Eureka nuts in that order, were most severely damaged. The filbertworm was the chief offender, followed by the navel orangeworm and the codling moth. Examination of 1,072 samples of nuts, representing 2,906 tons, made during September and October showed 1,072 infested nuts of which number 504 were attacked by the filbertworm, 372 by the navel orangeworm, 191 by the codling moth; and five by other species.

The navel orangeworm gained in importance as the season advanced, infestations of the other two became fewer. Poor orchard and processing plant sanitation contributed materially to these losses. Open hull piles and extensive orchard drops contributed to the development of high populations.

Vegetable Insects

Artichoke plume moth, *Platyptilia carduidactyla*, was responsible for heavy damage to artichokes along the coast, particularly during the latter part of the spring, showing 50 to 70 percent wormy buds in one county, 90 percent in another. The artichoke plume moth has caused severe financial loss to both growers and shippers for several years. It has required an increasing amount of work by county agricultural commissioners and inspectors in maintaining the minimum legal standards when offered for sale. Standardization inspections during 1954 showed 219 lots were rejected due to infestation, involving 19,432 packages ranging from 5 to 50 percent.

Satisfactory economic control by chemicals was obtained in few instances. Application of chemicals timed to coincide with deposition of eggs proved the most effective. Timing can best be determined by frequent field inspections by trained observers.

Growers, who practiced removal of wormy buds from the field before larvae could mature, generally had less loss, particularly in those fields somewhat removed from other plantings. Complete destruction or deep burial of infested stalks at the end of the season, also contributed to effective control.

Advisory Pest Control Service

During the year 177 contacts were made with agricultural commissioners in their counties, with respect to local pest control problems. Newer methods and materials used in pest control were discussed with agricultural inspection groups during many of these county contacts. Conferences with entomologists of the university regarding results of research studies in the control of particular pests were arranged on several occasions at Davis, Berkeley, and Riverside. Thirteen regional conferences of research and regulatory officials and growers relative to spray programs to fit particular counties or regions were attended. Talks regarding pest control were given on request, to several farmer groups. Investigation of purported damage from the application of spray materials was made on many occasions.

At the request of the fruit industry, disease and insect pest control spray schedules for deciduous fruits were prepared in collaboration with the Bureau of Plant Pathology and released to agricultural commissioners, inspectors, growers and others.

COMMODITY AND PREMISES TREATMENTS

CYRIL GAMMON and EARLE GAMMON, *Economic Entomologists*

Many problems are presented requiring the immediate development of effective measures which may be approved and serve as a means of alleviating the effects of plant quarantine measures by providing treatments under which otherwise restricted commodities might move from infested to clean areas without danger of further pest spread, or as required in the effective conduct of special eradication projects. Such work is preliminary to any longtime research which might be concurrently required which is the responsibility of state university authorities in

California or the United States Department of Agriculture. These concern not only the biological effectiveness of the treatment measures recommended but also the tolerance of the plant hosts concerned. The following pest species have received consideration during 1954 on that basis:

Khapra beetle (*Trogoderma granarium*): The major insect control problem during 1954 was that precipitated by the finding of the Khapra beetle, *Trogoderma granarium*, in grain storage in Tulare County, November, 1953, and in Fresno, Kings, Kern and Imperial Counties during the following year. It quickly demonstrated that its reputation of being hard to kill was equally apparent in the limited but heavy infestations encountered here. Warehouse men were anxious to rid their premises of this new storage pest and cooperated fully wherever test methods were proposed.

Early consideration was naturally given to sprays which could be applied to bin or building interiors either as controlling agents or as repellents. Such standard materials as DDT, dieldrin, chlordane, methoxychlor, malathion, pyrethum, allethrin, lethane and others were given extensive trial as full cover sprays under every conceivable condition.

Malathion quickly showed its superiority over all others either as a water spray or in concentration with dormant oils or as a dust. Used at the rate of five pounds actual in 100 gallons of water it gave 85-90 percent mortality of all larval stages, as compared with 21 percent mortality in the presence of 20 pounds of chlordane and 25 percent mortality using 10 pounds dieldrin (actual). Checks showed 0-10 percent mortality. Innumerable replications gave comparable results.

DDT at 20 pounds actual in three gallons of dormant oil proved unsatisfactory, as did also pyrethum and lethane, which had been declared satisfactory in England.

It was quickly determined that regardless of how effective the chemical used might be, the ability and habit of the larvae of hiding out deeply in incredibly fine building crevices and cracks made satisfactory control by contact impossible. Populations in many tests in empty warehouses were reduced to the point where infestation was not detectable and yet when new host grain was introduced for storage, it became almost immediately heavily infested.

The incorporation of malathion dust with grain as brought in for storage was found by the university to give protection against infestation at seven ppm. but could not be used where the grain was destined for consumption. The same precautions had to be taken with other promising materials for the same reason and could be used only where the host grain was intended for planting.

Attention turned to fumigation as applied to bins or buildings, with temporary success, where methyl bromide was used. However, reinfestation quickly occurred from larvae on the outside of or other parts of the building which were not included in the treatment area. It was not until late in the year that bureau entomologists proposed that the unorthodox method of covering the entire building with gastight tarpaulins, to permit fumigation superseded the more conventional method of sealing and fumigating the interior. Such proposals were not activated during the period being reported, and owners of storage warehouses and wholesale distribution centers continued to apply remedial measures which gave only temporary relief.

Extensive tests were conducted by the department in cooperation with the University of California and the United States Department of Agriculture in the development of treatment measures which might be approved to permit the safe movement of host grain from infested premises to clean areas. These results were finally crystalized to the point where they were accepted as a part of the restrictive quarantine measures established to discourage further spread. These concerned primarily the movement in railcars and trucks of bulk grain, sacked grain, processed host materials, and used bags and bagging.

In the treatment of bulk grain in railcars and van-type trucks, or in trucks under gastight tarpaulins, methyl bromide at the rate of four pounds per thousand cubic feet for 12 hours at 60 degrees F. or above, or five pounds at 40 degrees F. to 60 degrees F. was found satisfactory in the presence of forced recirculation of the fumigant. Where railcars were involved, doorways had to be sealed with laminated paper to make them gastight. Recirculation equipment similar to that designed by the United States Department of Agriculture for disinfection of corn where the European corn borer was involved was found adaptable to this problem.

As an alternative, use of a heavy fumigant such as EB5, ethylene dichloride-carbon tetrachloride, or carbon disulphide-carbon tetrachloride was found satisfactory under gastight covers or in a gastight truck or railcar under a 48-hour exposure. These materials were introduced into the grain stream as the car or truck was loaded using 10 gallons per railcar or six gallons per truck plus seven pounds of methyl bromide per car or two pounds per thousand cubic feet introduced over the top of the load where trucks were involved.

A third alternative permitted the use of one of the heavy fumigants mentioned in the preceding paragraph plus 10 percent methyl bromide, by volume, added to the grain stream during loading of van-type trucks or railcars or open trucks under gastight tarps, used at the rate of three gallons per 10 tons plus two pounds of methyl bromide per thousand cubic feet over the load, such measures to be applied under a 12-hour exposure. Use of 2 percent chloropicrin as a warming gas was recommended where these alternative treatments using heavy liquid fumigants, was involved.

Obviously the time involved in these treatments was not satisfactory to the carrier lines and every effort has been made to reduce the exposure period. Some promising results with the heavy liquid fumigants were being developed at the close of the year which suggest that the time may be cut to three hours. However, further work is necessary before such measures can be approved.

With respect to sacked material, fumigation in sealed box cars or under gastight tarpaulins or in a gastight chamber was proven effective when methyl bromide was used at the rate of three pounds per thousand cubic feet for 12 hours at 60 degrees F. or above or four pounds at 40 degrees F. to 60 degrees F. Fan circulation was found necessary to assure distribution of the gas where this method was used.

In the matter of processed grain it was found that exposure to 150 degrees F. for 10 minutes as occurs in most such handling was effective against all stages of the Khapra beetle. This was later confirmed by the United States Department of Agriculture with a reduction in the time to seven minutes.

Fumigation of used burlap sacks either loose or baled has proven a difficult problem and still not fully solved. The sorption by burlap when methyl bromide is involved is so great as to depreciate the control effectiveness of the concentration used. First recommended to be used at four pounds and five pounds per thousand cubic feet at 60 degrees F. and above or 40 degrees F. to 60 degrees F. respectively for two hours, the dosage has been progressively increased to five and six pounds and to seven and eight pounds and the time to 24 hours. There are still some reports of larval survival at even these high dosages and extended exposure periods.

Obviously there is still considerable work to be done before satisfactory treatments are developed that will meet all situations which need the full attention of all research agencies.

One phase of this entire treatment problem where Khapra beetle is involved is the varied intolerance of planting seed to the high dosages of methyl bromide being used and the extended exposure periods followed. Preliminary studies in which the bureau has participated indicate that cereals and leguminous seed are fairly tolerant to these measures but that those of high oil content such as cottonseed, flax, corn, milo and other similar seeds cannot be treated safely. The importance of moisture control was developed with respect to this problem in which it was found that moisture should not be above 10 percent.

Artichoke plume moth, *Platyptilia carduidactyla*: In order to relieve the serious losses being experienced by California growers from the presence of so-called invisible worms after the artichoke has been harvested and is moving to market the bureau undertook the development of remedial measures. The use of dips found promising in the control of fruit flies in the Hawaiian Islands, using ethylene dibromide 1-30,000 in water at a temperature of 110 degrees F. for 20 minutes, does not seem applicable to this problem. It was found that even at 1-4,000 it was not effective against the larvae of the artichoke plume moth and that the artichokes were intolerant to temperature even as high as 100 degrees F. Subsequently it was found that fumigation using methyl bromide at two pounds per thousand cubic feet for two hours at 70 degrees F.-75 degrees F. was fully effective resulting in complete larval mortality, where used. It was also found that the artichokes were fully tolerant to this dosage and exposure. It was further found that an increase of one-half pound methyl bromide might be made for each five-degree drop in temperature without affecting the effectiveness of the treatment. Growers, however, are still putting their faith in field sanitation.

Rice Leaf Miner, *Hydrellia griseola*, and Tadpole Shrimp, *Apus oryzaphogus* and *A. biggsi*: Field tests made at the request of rice growers in the Sacramento Valley showed that dieldrin at one-quarter pounds actual per acre was effective in the control of both of these pests provided the water was held. DDT was found less effective.

Wheat Sawfly, *Pachynematus sporax*: The use of one pound DDT in two gallons of diesel oil per acre was recommended and applied in April of 1954 to 12,075 acres of wheat in the Cuyama Valley in Santa Barbara and San Luis Obispo Counties in combating an outbreak of this pest, reported in California for the first time in 1953. Application was made by plane using beet leafhopper materials, personnel and ground equipment. Results were excellent from the standpoint of holding the infestation to permit further study and determining whether eradication should be attempted. There was no detectable damage to the wheat from the spray materials. Only surviving sawflies were found where application had failed to fully cover the intended area.

Tolerance of Fruit Budwood to Methyl Bromide: Working with University of California pomologists at Davis, measures were developed eliminating heavy loss of cherry and peach budwood when subjected to methyl bromide in meeting certain quarantine requirements using two and one-half pounds per thousand cubic feet for two hours at 80 degrees F. It was demonstrated by bureau entomologists that the losses were due not to the fumigant, the dosage used or length of the exposure period, but rather to failure to properly aerate the budwood following fumigation. Once this was put into practice no further difficulties were experienced.

Plane Tree Scale, *Stomococcus plantani*: In response to request for assistance in combating this serious pest of plane trees which are grown extensively as roadside shade trees throughout the State it was found that malathion alone or in combination with oil could be used effectively. One pound actual in 100 gallons of water was found as effective as higher dosages with oil. Three-quarters pound and one pound were both used experimentally in one gallon of light medium emulsive oil with good results.

Soil Mealy Bugs, *Rhizococcus falcifer*: Field tests using ethylene dibromide, methyl bromide and malathion as dips, were tested as means of controlling this pest in nurseries. Results look promising but need further study before recommendations can be made.

Pit-making Scale, *Asterolecanium minus*: This pest was responsible for serious damage to oaks in many parts of the State, particularly the interior valley. Heavy infestation resulted in killing out many smaller branches giving a very unsightly appearance to the tree. A chestnut oak in Capitol Park in Sacramento was found severely damaged during the late summer months. Toxaphene and oil was recommended and used in its control.

Cooperating with the Bureau of Fruit, Nut and Vegetable Standardization, examination of certified seed potato test plots at Half Moon Bay in San Mateo County showed very few insects present of a pest nature. Potential vectors of virus disease were noticeably absent though considerable mosaic was in evidence. No psyllids or aphids were observed. Some tuber moth was present and predicted as possibly being responsible for serious damage later.

Grasshoppers: Considerable assistance was extended to county agricultural commissioners in meeting local grasshopper control problems. Effective control in olive orchards was demonstrated in Butte County using dieldrin dry bait. Aldrin and dieldrin used in various central valley counties gave good control when applied as a strip spray to margins of cropland. Sunflower plantings were protected against damage using one-half pound dieldrin per acre as a spray. Aldrin at two and one-half ounces in two and one-half gallons of water per acre when applied by plane was used successfully against the clear-wing species in Plumas County.

At the close of the year bureau records showed 61 fumigation chambers in operation in 17 counties approved by bureau personnel for use in the application of required quarantine treatments. All such chambers, once approved, are checked annually by the county agricultural commissioner concerned following an outlined procedure furnished by the bureau to assure that they are in good repair, properly equipped and properly operated.

Practically all of the treatment measures here reported were covered in detail in mimeographed releases made available to all county agricultural commissioners and other interested parties.

SYSTEMATIC ENTOMOLOGY

H. H. KEIFER, *Systematic Entomologist*

A total of 25,328 insect specimens were received and identified during 1954. There was a notable increase in the number of specimens submitted by county agricultural commissioners and state survey entomologists. County submissions increased from 4,731 in 1953 to 11,118 in 1954, or 135 percent. The survey entomologists sent in specimens resulting in 1,182 identifications which is an increase of 372, or 38 percent over 1953. The taxonomic problems arising from the insects submitted by these workers are the more difficult, since species represented are far more diverse than those received from any other source. Total submissions during 1954 are summarized as follows:

TABULATION OF INSECT IDENTIFICATIONS, 1954

	State Depart- ment of Agriculture	County agricultural commissioners	Miscel- laneous	Total
General identifications -----	1,057	6,283	---	7,340
Quarantine:				
Interior -----	---	163	---	163
Interstate -----	---	206	---	260
Border -----	5,100	---	---	5,100
Ports -----	24	---	---	24
Surveys, general -----	1,182	---	---	1,182
Cherry fruit fly -----	3,091	---	---	3,091
Khapra beetle -----	446	---	---	446
Mexican fruit fly -----	284	---	---	284
Pink bollworm -----	189	---	---	189
Red scale -----	---	4,412	---	4,412
Walnut survey -----	---	---	1,780	1,780
Nursery service -----	108	---	---	108
U. S. Bureau of Entomology -----	---	---	327	327
University of California -----	---	---	34	34
Eriophyid mites -----	---	---	180	180
Miscellaneous -----	---	---	408	408
Totals -----	11,481	11,118	2,729	25,328

The principal taxonomic problem presented this year was that of learning how to identify the larva and adult of the Khapra beetle, *Trogoderma granarium*. The importance this beetle assumed in the grain storage industry in California made accurate identification of the species absolutely necessary. The problem was complicated by the presence of five additional congeneric species generally associated with grain storage in California. Four of these other *Trogodermas* are so similar that microscopic examination of dissected parts is necessary to complete the identifications. F. L. Blanc and G. T. Okumura of the bureau's taxonomic laboratory undertook the work of developing distinguishing characteristics for the Khapra beetle. At the beginning of 1954 they had available two important references. The first, by H. E. Hinton on stored products beetles, contained data on Khapra beetle, but not on most of the California forms with which it was most likely to be confused. A second, by R. S. Beale, Jr., contained information on all *Trogodermas* found in California except the Khapra beetle. A third source, in unpublished manuscript, made immediately available for administrative use through the courtesy of the author, Dr. R. W. Howe, Department of Scientific and Industrial Research, Pest Infestation Laboratory, Slough, England, distinguished the Khapra beetle from a second species in a novel and clear-cut manner, and furnished the key to differentiating this beetle from the other species present in California. We can, therefore, report the success of the effort directed toward the accurate identification of the Khapra beetle and its relatives in California. California is fortunate that R. S. Beale, Jr., had started work on these dermestid beetles a few years ago. His publication gave us the means of segregating the additional *Trogodermas* in California. The assembled key thus made available by Blanc and Okumura has given the bureau a tremendous advantage in the accurate identification of the Khapra beetle.

A second new insect presenting a taxonomic problem in California, which is of major importance as a pest of alfalfa, is the yellow clover aphid, *Therioaphis*

ononidis (Kalt.). This aphid has its own distinctive characters enabling ready identification except for the following problems in connection with it. The common name "yellow clover aphid" was first used for a clover infesting species in eastern North America described as *Myzocallis trifolii* (Monel). This eastern aphid, while apparently the same as the form in California, however, infests only clover where it occurs and is not known to attack alfalfa as does the California species. On the other hand a very similar aphid in India has habits similar to the California type and is a pest of alfalfa. Before we can be certain of the origin of the California species and its precise nomenclature, studies of examples from other parts of the world are necessary.

The Walnut Growers Association of the Sacramento Valley and Linden submitted 1,780 specimens for identification during October, November and December representing Lepidopterous larvae found infesting walnuts as received for processing and packing. They were concerned with the damage observed in walnuts coming into packing houses which caused many growers to fail to realize any profit on their 1954 crop. There were three principal species involved in these determinations, namely, the codling moth, the navel orangeworm, and the filbert worm. The most interesting of these, from the standpoint of taxonomy, is the filbert worm, *Melissopus latiferreanus* (Wlsm.). Unlike the other two it is a native species. More often than not a native insect is not as serious an agricultural pest as an imported species. But in the Sacramento Valley during 1954 the filbert worm was found to be the principal species doing primary damage to the harvested walnuts. The filbert worm is not a storage pest and only infests the walnuts in the field. However, when carried into storage on walnuts in the fall, if not fully mature, they continue to feed and materially extend the original field damage.

The Strawberry Institute of California presented a problem in insect identification involving native ground weevils. These weevils occur principally along the coast in the San Jose-Santa Cruz area. They belong to the genus *Nemocestes* and the identification problem concerns species limits and distribution. Apparently the species are all parthenogenetic, though that situation remains to be further investigated. They have proven difficult to control which is why the institute has sought basic knowledge on the species involved.

The Taxonomy Laboratory prepared and distributed to commissioners and others 334 plastic blocks containing 59 different species of insects, respectively. Of these, 155 were Khapra beetles and 80 contained the Mexican fruit fly.

Insect species new to California submitted for identification from various sources during 1954 included the avocado rust mite, *Calepitrimerus muesebecki* K.; the scurfy scale, *Chionaspis furfura* (Fitch); the honey locust scale, *Chionaspis gleditsiae* Sanders; an *Eriococcus* sp. given the common name *Pittosporum* scale; a wheat sawfly, *Pachynematus sporax* Ross; an orchid mealybug, *Pseudococcus* sp.; the yellow clover aphid, *Therioaphis ononidis* (Kalt.); and a bagworm, *Thyridopteryx ephemeraeformis* (Haw.).

Insect pest species of restricted distribution within California which on the basis of specimens submitted for identification appeared to be actively enlarging their ranges in the State were covered by 74 extension reports issued during 1954. Some examples of such movement include the carnation budmite, *Aceria paradianthi* K., which moved east from Los Angeles into San Bernardino County; the clover casebearer, *Coleophora spissicornis* Haw., which spread south from Sacramento to San Joaquin County; the green fig beetle, *Cotinis teana* Casey, previously restricted to Riverside and San Bernardino Counties, showed up in Imperial, San Diego, and Los Angeles Counties; the first appearance of the Egyptian alfalfa weevil, *Hypera brunneipennis* (Boh.) in San Bernardino County was recorded 15 miles east of the nearest previous location in Los Angeles County; the clover seed weevil, *Miccotrogus picrostris* (Fab.) was reported in Plumas County; the olive palatoria scale, *Palatoria oleae* (Colvée) appeared at Antioch in Contra Costa County representing the first established infestation in a coastal county; the walnut huskfly, *Rhagoletis completa* Cress., was submitted from Sonoma County representing its first reported occurrence north of the Tehachapis; the brown-banded roach, *Supella supellectillum* (Serv.) was reported for the first time in Santa Barbara County. Yellow clover aphid, *Therioaphis ononidis* (Kalt.), first reported in 1954 in San Diego, was shown to be generally distributed on alfalfa in Imperial and Riverside Counties with spot infestations in San Bernardino, Orange and Los Angeles Counties. The Khapra beetle, *Trogoderma granarium* (Everts) at first was only known from Fresno, Tulare, Kings, Kern and Imperial Counties. By

the end of the year it was submitted from San Bernardino, Riverside, Los Angeles, Madera and San Francisco Counties.

The Insect Identification Laboratory made 77 slide identifications of bacterial diseases of bees during 1954 for the Supervising Apiary Entomologist.

There was a marked increase in the number of insect specimens submitted for identification by county agricultural commissioners as shown in the following table. Tulare County took the lead as the result of an intensive survey to locate an existing infestation of citrus red scale pertinent to increased application of suppressive measures.

	L	Q	
1. Tulare	3161	1	
2. San Diego **	1384	61	
3. Fresno	351	15	
4. Kern	248	24	
5. San Bernardino	249	10	
6. Santa Cruz	222	8	
7. Riverside	215	5	
8. San Mateo	165	20	
9. Alameda *	154	19	
10. Los Angeles *	117	46	
11. Kings	155	3	
12. Ventura *	136	18	
13. Butte	141	9	
14. Stanislaus	125	14	
15. Santa Barbara	123	8	
16. Contra Costa	115	10	
17. Sacramento	118	2	
18. Imperial	11	5	
19. Santa Clara	108	5	
20. Humboldt	97	10	
21. Merced	95	2	
22. Solano	77	11	
23. Orange *	76	7	
24. Monterey	74	3	
25. Madera	70	1	
26. Glenn	53	3	
27. Siskiyou	49	2	
28. Yalo	49	0	
29. Placer	47	1	
30. Sutter	48	0	
31. Tehama	44	0	
32. San Francisco **	43	0	
33. Marin	42	0	
34. Sonoma	35	5	
35. Napa	36	2	
36. San Luis Obispo	33	2	
37. Shasta	33	0	
38. San Joaquin	18	13	
39. Modoc	31	0	
40. Lake	30	1	
41. Calaveras	27	0	
42. Colusa	26	1	
43. San Benito	15	0	
44. El Dorado	14	0	
45. Mariposa	14	0	
46. Yuba	9	0	
47. Del Norte	9	0	
48. Lassen	8	1	
49. Plumas	7	1	
50. Tuolumne	6	1	
51. Amador	6	0	
52. Nevada	3	0	
53. Mendocino	2	0	
54. Trinity	1	0	
55. Alpine	1	0	

Legend:

L—Local Collections

Q—Quarantine

*—Employ Own Taxonomists

**—Have Access to Local State Taxonomists

Insects Submitted for Identification by the County Agricultural Commissioners

APIARY INSPECTION**ELBERT R. JAYCOX**, *Supervisor of Apiary Inspection*

California's honey production in 1954, as estimated by the Crop and Livestock Reporting Service, was 33,831,000 pounds from 537,000 colonies. This figure shows a ten million pound or 43 percent increase over the preceding season.

Early honey flows from buckwheat, cotton, orange and sage were very good but gave little surplus yield later in the summer due to cool weather. Star thistle production was spotty as a result of similar weather conditions.

Pollination services continued at the reduced levels of 1953. Most beekeepers have now had pollination experience in some form and as a result are resolving into groups operating according to their work preference. These include those who have returned to full honey production, those who operate with pollination as their primary effort and source of revenue, and those who emphasize honey returns but who maintain some pollination interests to assure income if honey crops fail.

Again during 1954 the incidence of American foulbrood in the State showed an increase to a new high of 2.77 percent. This continues the general upward trend in the disease rate that began prior to 1942. In the major beekeeping counties, however, disease incidence was even less than in 1953. Disease outbreaks in large, carelessly operated outfits and the expansion of inspection have been responsible for over-all increases. One county provided more than 15 percent of the disease total, most of it attributable to a single beekeeper, while another county, where no inspections had been made for 10 years, found disease in 11 percent of the colonies inspected. Thirty-seven counties employed inspectors who gave at least part of their time to bee inspection. Of these, eight were newly qualified for the work. Four counties utilized the services of a deputy state bee inspector; in 18 counties no inspection work was done.

More than twice as much European foulbrood was reported as in the 1953 season. In California this disease is not as serious as in some of the eastern states, but it does lower honey production and is particularly serious to the package bee producers.

One hundred seventy-eight samples of brood and bees were diagnosed for disease. Of these, 94 revealed American foulbrood, 61 showed European foulbrood, with the remainder showing no bacterial disease present. Four samples were recorded as infected with *Nosema* disease. Known in California before 1921, this latter disease, believed to be the cause of queen supersedure in package bee colonies, may be of greater significance here than commonly acknowledged. Reference slides of the causal agents of bee diseases were prepared and made available to five counties equipped to make their own microscopic disease examinations.

Few serious losses to bees resulted from the use of pesticides; however, one large apiary was wiped out by an application of dieldrin dust to a seed carrot field in bloom. Other damage appeared minor, but it is felt by many beekeepers that continued treatments, even with the less toxic materials, lower the yield of honey and seed by reduction of colony field forces.

During 1954 151 apiary brand numbers and 102 identification numbers were issued. One new wax-salvage plant was licensed near Bloomington, San Bernardino County. Two plants are now located in this county with a third in Colusa County.

Bee equipment thefts appear to be increasing with nine lots totaling 316 colonies reported stolen. Largest single losses were two apiaries of 96 colonies each. Despite publicity given these thefts, no equipment was recovered.

TABLE NO. 7
Record of Inspection

County	Apiaries			Colonies		
	Registered	Inspected	Diseased	Registered	Inspected	Diseased
Alameda.....	234	54	12	6,478	1,303	61
Alpine.....						
Amador.....	8	0	0	341	0	0
Butte.....	700	260	19	23,000	6,482	29
Calaveras.....	30	36	1	416	607	2
Colusa.....	161	123	71	10,270	7,402	153
Contra Costa.....	59	86	20	1,608	2,974	65
Del Norte.....	2	0	0	8	0	0
El Dorado.....	4	0	0	29	0	0
Fresno.....		121	30		10,099	386
Glenn.....	181	41	11	6,831	957	82
Humboldt.....	31	1	0	79	2	0
Imperial.....	595	226	86	27,449	13,091	264
Inyo.....						
Kern.....	441	169	41	29,829	7,413	167
Kings.....	143	6	1	11,571	199	1
Lake.....	19	19	0	182	182	0
Lassen.....	12	21	4	46	357	4
Los Angeles.....	647	602	118	30,381	11,900	394
Madera.....	8	55	7	925	482	26
Marin.....	15	0	0	82	0	0
Mariposa.....						
Mendocino.....	43	30	0	250	97	0
Merced.....	257	103	47	17,056	5,760	145
Modoc.....	3	0	0	750	0	0
Mono.....						
Monterey.....	37	46	5	2,661	2,853	8
Napa.....	0	65	7	0	1,411	20
Nevada.....	3	0	0	12	0	0
Orange.....	264	309	16	8,457	3,875	100
Placer.....	0	59	9	0	2,155	30
Plumas.....	4	1	0	36	12	0
Riverside.....	505	171	30	21,625	5,260	98
Sacramento.....	136	26	3	4,000	978	8
San Benito.....	2	2	2	45	40	32
San Bernardino.....	534	534	77	13,465	20,458	195
San Diego.....	550	125	57	25,185	6,940	349
San Francisco.....	6	7	3	31	24	3
San Joaquin.....	124	5	4	8,553	83	6
San Luis Obispo.....	110	8	2	4,225	149	5
San Mateo.....	102	100	7	881	876	13
Santa Barbara.....	91	63	4	4,159	1,800	18
Santa Clara.....	141	104	24	1,343	1,237	146
Santa Cruz.....	100	22	3	1,759	1,344	11
Shasta.....	179	70	14	10,682	5,404	47
Sierra.....						
Siskiyou.....	48	10	6	1,664	80	16
Solano.....	157	94	13	6,457	3,860	16
Sonoma.....	122	118	41	3,694	3,373	161
Stanislaus.....	150	96	31	7,017	1,987	59
Sutter.....	234	174	27	12,094	7,154	136
Tehama.....	236	75	3	8,083	2,610	6
Trinity.....						
Tulare.....	91	86	16	7,114	1,327	250
Tuolumne.....	36	0	0	313	0	0
Ventura.....	144	78	32	6,022	3,105	655
Yolo.....	166	59	19	13,112	1,693	53
Yuba.....	29	55	8	2,013	3,067	10
Totals.....	7,894	4,515	931	342,683	152,462	4,230

Percent apiaries diseased..... 20.6
 Percent colonies diseased..... 2.77
 Percent estimated number of colonies in the state which were registered..... 63.8
 Percent estimated number of colonies in the state which were inspected..... 28.4

TABLE NO. 8
RECORD OF MIGRATION

County	Interstate				Intercounty				Intracounty	
	Into		Out of		Into		Out of		Apiaries	Colonies
	Apiaries	Colonies	Apiaries	Colonies	Apiaries	Colonies	Apiaries	Colonies		
Alameda					8	857	13	1,385	7	407
Alpine										
Amador					6	291	5	232		
Butte	5	1,409	2	286	104	6,730	115	7,734	165	6,397
Calaveras			2	173	2	176				13
Colusa					17	1,387	13	987	21	1,068
Contra Costa					36	3,655	48	5,449	28	1,196
Del Norte										
El Dorado						483		330		
Fresno					89	15,244	127	13,189	232	15,273
Glenn	1	2			46	2,452	50	2,870	63	2,042
Humboldt										
Imperial					9	992	17	1,571	9	218
Inyo										
Kern					1,173	58,044	683	45,934	374	21,910
Kings					84	8,595	73	7,628	4	330
Lake					1	261				
Lassen					20	1,145	11	565	11	348
Los Angeles	1	92			41	32,245	249	26,095	253	17,589
Madera					53	4,156	45	3,816	31	1,538
Marin					2	65	1	84		
Mariposa										
Mendocino										
Merced					113	8,675	97	17,089	22	1,113
Modoc					3	859	3	785		
Mono										
Monterey					57	5,036	63	5,239	27	2,738
Napa					18	1,360	18	1,469	8	360
Nevada					3	483	3	284		
Orange	7	735	10	1,250	193	22,075	107	9,269	46	4,371
Placer	1	232	2	300	25	1,407	8	396	49	1,705
Plumas										
Riverside	4	710	25	3,790	171	17,773	168	17,647	126	11,351
Sacramento	1	72	3	466	38	2,994	39	3,310	24	666
San Benito					28	2,822	21	2,506	2	161
San Bernardino	55	11,385	36	12,163	273	24,042	258	21,809	241	13,602
San Diego	3	825			84	8,602	78	7,328	107	2,018
San Francisco										
San Joaquin					80	7,113	89	7,782	125	8,429
San Luis Obispo					81	7,406	43	4,058	34	3,007
San Mateo					7	398	9	384	2	41
Santa Barbara					8	682	9	574	12	1,187
Santa Clara					73	5,539	47	3,196	10	95
Santa Cruz					5	356	9	1,987	2	375
Shasta	14	1,374	6	1,280	86	7,124	40	3,212	68	5,134
Sierra										
Siskiyou	13	852	1	70	16	711	6	335	3	99
Solano					48	4,133	14	1,430	81	6,734
Sonoma										
Stanislaus					112	12,530	63	8,058	67	7,940
Sutter		2,028		520	54	10,173		5,325		2,799
Tehama					38	2,015	48	2,496	24	1,238
Trinity										
Tulare			1	124	76	31,244	55	24,760	13	1,404
Tuolumne					1	80	1	205	1	70
Ventura	1	451	2	655	73	10,593	87	8,994	28	1,387
Yolo					66	5,367	48	3,374	146	8,812
Yuba					20	1,898	14	789	13	698
Totals	106	20,167	91	21,077	3,541	340,088	2,895	281,659	2,481	155,863

General Informational Service

The bureau has available twelve entomological films covering the major pest insect species receiving special attention by the department. These films in color portray the various life history stages of each species, typical plant damage due to their attack, and the measures being used to secure their control or eradication. In this manner regulatory officers and growers can best be acquainted with pests and the problems involved.

During 1954 the films shown to county agricultural commissioner, inspector, university and grower groups are as follows:

<i>Films</i>	<i>No. of showings</i>	<i>No. of individuals</i>
Beet leaf hopper -----	1	12
Corn borer -----	6	143
Grape leaf skeletonizer -----	2	20
Fumigation methods -----	4	58
Hall scale -----	2	20
Mexican bean beetle -----	3	37
Mexican fruit fly -----	10	336
Oriental fruit fly -----	14	600
Olive scale -----	2	19
Oriental fruit moth -----	2	44
Cherry fruit fly -----	3	32
500,000 to 1 -----	37	4,528
Totals -----	86	5,849

In addition representative specimens of these pests imbedded in plastic have been prepared by the office of insect identification in the bureau and made available to field workers and growers. These included the Mexican fruit fly, Khapra beetle, both of which became new species of concern to California in 1954 and attracted widespread attention.

BUREAU OF PLANT QUARANTINE

A. P. MESSENGER, *Chief*

This bureau is charged with enforcement of California plant quarantine laws and state and federal quarantine regulations designed to prevent or delay introduction or further spread of insects, plant diseases, animals and weed pests which could be detrimental to the agricultural industry of the State.

Headquarters are located at Sacramento, with field inspection stations maintained at the three major maritime ports of San Francisco, San Pedro and San Diego, and at 17 points near the border on the principal highways entering California. Inspectors stationed at the three major seaports also cover all airports in the vicinity of these stations at which foreign planes, passengers and cargoes arrive and are inspected on regular schedules.

In addition to the three major maritime ports, there are seven smaller ports where ship inspections are made by county agricultural commissioners. These are located at Eureka, Monterey, San Luis Obispo, Santa Barbara, Stockton, Ventura and Hueneme. All inspectors at the major maritime ports and at least one inspector at each of the minor ports are authorized to enforce foreign quarantines of the United States Department of Agriculture through a collaboratorship arrangement with the Plant Quarantine Branch. This cooperative relationship is coordinated by a United States Department of Agriculture area supervisor stationed at San Francisco and having jurisdiction over the federal branch activities on the Pacific Coast, Hawaii and Guam.

The enforcement of plant quarantine laws and regulations at interior points is carried on by county agricultural commissioners and members of their staffs. This involves inspection, at terminal and destination points, of plant products moving into California from other states, or moving from one county to another.

For the purpose of this report, enforcement work is divided into five phases: administration, dealing with laws and regulations; port districts (inspection of vessels and aircraft); border districts (inspection of highway vehicles entering the State); interior inspection (enforcement work at interior points by agricultural commissioners); and nursery service (inspection and licensing of nurseries).

ADMINISTRATION

Regulations, Amendments and Revisions

CHERRY FRUIT FLY EXTERIOR QUARANTINE (Section 3256 C. A. C.). Amendment No. 2 was issued April 16, 1954, to add Grant County, Washington, to the infested area.

SWEET POTATO WEEVIL EXTERIOR QUARANTINE (Section 3257 C. A. C.). Amendment No. 8 was issued April 30, 1954, to add Beaufort County, South Carolina, and Leon County, Texas, to the infested area.

PEACH MOSAIC DISEASE EXTERIOR QUARANTINE (Section 3262 C. A. C.). Amendment No. 6 was issued April 20, 1954, to add Blanco County, Texas, to the area under quarantine and to release from the quarantined area the Counties of Hempstead and Pike, in Arkansas, and Upshur and Wood Counties in Texas.

EUROPEAN CORN BORER EXTERIOR QUARANTINE (Section 3263 C. A. C.). Amendment No. 2 was issued March 3, 1954, to add the State of Wyoming to the list of states in which European corn borer exists.

KHAPRA BEETLE EXTERIOR QUARANTINE (Section 3270 C. A. C.). This quarantine, issued November 30, 1954, designated the area under quarantine to be the Counties of Graham, Maricopa, Mohave, Pima, Pinal and Yuma, in Arizona, and the Counties of Curry and Roosevelt, in New Mexico. Restricted articles from the quarantine area must be accompanied by a certificate evidencing treatment by approved methods or certifying that articles are from properties which have been inspected and no Khapra beetle found. Commodities requiring certification include all grain and grain products, dried seeds and seed products of field and vegetable crops, bags and bagging, dried milk, dried blood, fish meal, meat scraps

and any other article or thing, exposed to infestation which might constitute a hazard of spreading the pest.

QUICK DECLINE INTERIOR QUARANTINE (Section 3407 C. A. C.). Amendment No. 1, issued August 27, 1954, made several changes in the areas affected by the regulation. All of Ventura County and a portion of Santa Barbara County were included as quarantined area. The lightly infected area in Ventura County was extended to include all of the formerly regulated and lightly infected area **except** the Moorpark area. The lightly infected area in Ventura County was also extended eastward to include areas adjacent to the Los Angeles County line. The lightly infected area in Los Angeles County was extended westward to the Ventura County line.

GRAPE LEAF SKELETONIZER INTERIOR QUARANTINE. (Section 3410 C. A. C.). Amendment No. 7 was issued July 8, 1954, to extend the quarantine lines in San Diego and Riverside Counties. Two additional townships were added in Riverside County and seven additional townships were added in San Diego County. Ethylene dibromide was approved as a fumigant for treatment of fresh fruits.

CLUB ROOT DISEASE INTERIOR QUARANTINE (Section 3413 C. A. C.). Amendment No. 1, issued December 23, 1954, became effective January 22, 1955. The quarantine was lifted in San Francisco County and the eastern portion of San Mateo County lying south and east of San Bruno-Crystal Springs Road and Sky-line Boulevard. The quarantine line was extended southward in the vicinity of Half Moon Bay, and a small additional area in the vicinity of Bolsa Point was placed under quarantine. The list of commodities covered was amended to include all roots or plants with roots of broccoli, Brussels sprouts, cabbage and cauliflower, and used farming appliances, vehicles, machinery, tractors and field implements **except** hand tools. The restrictions were amended to provide for the movement, from quarantined areas, of farming implements, etc., after disinfection or washing and steam cleaning.

MEXICAN FRUIT FLY INTERIOR QUARANTINE (Section 3417 C. A. C.). Upon finding a Mexican fruit fly at San Ysidro, this regulation, issued August 10, 1954, established quarantine lines in San Diego County around an area adjacent to the international border. Commodities covered include host citrus fruits **except** lemons and sour limes; mangoes, sapotas (including sapodillas and the fruit of all members of the family Sapotaceae and of the genus Casimiroa and all other fruits commonly called sapotas or sapotes), apples, apricots, ciruelas, guavas, mameys, peaches, pears, plums, pomegranates, quinces, fruits of species of the genus *Sargentia* and any other fruit which may later be determined as susceptible.

Host fruits moved from the quarantine area must be certified, evidencing treatment by approved methods. Provision is made for reshipments of fruits from the quarantined area which have been moved into the area for processing and protected from infestation. No restrictions are placed on the movement of fruits within the area under quarantine **except** that any fruits are prohibited movement from infested properties unless treated or processed.

KHAPRA BEETLE INTERIOR QUARANTINE (Section 3418 C. A. C.). This quarantine, issued December 13, 1954, became effective January 12, 1955. The area under quarantine is the infested property itself. The list of infested properties was issued supplemental to this regulation. Commodities covered are the same as set forth in the exterior quarantine described above. Regulated articles cannot be moved from infested properties except under certificate or permit. Certificates may be issued and articles certified on the basis of inspection, provided adequate inspection can be made to determine the presence or absence of the beetle; or articles may be certified on the basis of treatment by approved methods. Certificates may also be issued on articles which, in the judgment of the commissioner, have been stored or handled under conditions and in such a manner that the pest would not be carried with the article. Permits may be issued for the movement from infested properties of untreated articles for immediate consumption, such as feed in open feed lots, corals, pens, or of untreated seed for immediate planting, providing the receiver agrees to handle such articles in a manner to assure that his property will not become infested.

PORT DISTRICTS

Vessels and aircraft arriving from foreign and off-shore points are required to pass plant quarantine inspection at maritime ports and airports. Passenger and crew baggage, their quarters, ship and aircraft stores and cargoes are examined to ascer-

tain if quarantined plant material is present. When prohibited or restricted items are discovered, appropriate safeguard action is taken.

A table of comparative figures for 1953 and 1954 covering maritime and air inspections follows:

	1954	1953
Ship Inspection		
Total arrivals (domestic, foreign and territorial)	9,404	11,298
From foreign countries	6,727	8,302
With prohibited material	2,820	3,029
From Hawaii	574	663
With prohibited material	254	257
From domestic ports	2,103	2,333
With prohibited material	280	284
Passengers (foreign and territorial)	72,264	68,733
From Hawaii	28,834	27,462
Airplane Inspection		
Total arrivals (inspected)	2,817	2,553
From Hawaii	29	35
With prohibited material	2	0
From foreign countries	2,788	2,518
With prohibited material	593	422
Passengers (foreign and territorial)	33,558	31,398
From Hawaii	89	107
Shipments entered under permit	1,911	2,169
Packages treated or cleaned before release	52,231	131,494
Restricted and prohibited material rejected	18,547	16,795
Pest interceptions (insects and diseases)	14,100	18,358

Harmful pests were intercepted 14,100 times. Out of a total of 845 lots of fruit fly host material arriving from Hawaii, 39 were found infested with fruit flies; from 4,690 lots of such material from foreign countries, 22 were found infested with fruit flies. If limited time had not prevented minute inspection of each interception, more infestation would probably have been noted.

Other important pests observed were 17 lots of green coffee scale, 321 lots of mango seed weevils, 14 lots of West Indian bean pod borers, 10 lots of rice stem borers, one European corn borer, one lot of citrus black flies, 55 lots of citrus canker; golden nematodes were found six times, burrowing nematodes from Hawaii were found seven times, citrus white flies were noted twice from southern states, with one European corn borer from Indiana.

Sanitary Export Certificates were issued 6,396 times.

BORDER DISTRICTS

Border station traffic figures again show an increase in the number of vehicles inspected over the previous year. There were increases in passenger cars, commercial trucks and a corresponding increase in passengers.

A total of 3,492,068 cars were inspected in 1954, compared with 3,436,908 in 1953. Commercial trucks handled in 1954 totaled 297,704; this compares with 274,939 for 1953. The increase in passenger car travel for 1954 was in those bearing California



Examining orchid plants from Brazil in the screen room at the Bureau's San Pedro office.

license plates, with a decrease being shown in those with foreign license plates. During 1954 there were 1,863,555 cars with California plates and 1,638,513 with out-of-state plates. During 1953 there were 1,789,504 cars bearing California plates and 1,647,404 with out-of-state plates.

The passenger count for all types of vehicles showed an increase, over 1953, of 123,003 passengers.

The following chart shows a comparison of traffic for the past four years:

CHART NO. 1

Station	1954		1953		1952		1951	
	Vehicles	Passen- gers	Vehicles	Passen- gers	Vehicles	Passen- gers	Vehicles	Passen- gers
Blythe.....	414,252	1,162,352	422,833	1,209,914	425,946	1,176,036	382,091	1,069,916
Daggett.....	315,955	971,097	304,479	909,107	240,794	726,267	188,986	597,407
Fort Yuma.....	397,320	1,032,457	399,054	1,089,740	386,906	1,053,526	327,472	895,388
Parker.....	191,174	471,909	156,216	388,223	118,488	291,639	80,026	189,545
Yermo.....	654,199	1,676,364	649,969	1,689,652	573,406	1,511,619	533,046	1,385,589
Alturas.....	39,900	97,093	37,379	90,827	32,094	76,877	31,578	74,524
Dorris.....	252,913	576,022	229,654	565,430	209,517	516,729	201,636	492,854
Hornbrook.....	256,381	725,216	255,679	727,296	239,189	673,162	219,523	646,478
Redwood Highway.....	150,844	414,822	154,125	407,243	154,915	415,609	140,510	385,905
Smith River.....	121,421	342,321	109,656	314,823	118,781	340,351	110,357	319,215
Tulelake.....	60,889	157,575	61,092	158,251	53,702	139,246	52,167	133,433
Benton.....	52,940	113,030	51,171	110,481	45,682	99,930	37,383	79,787
Brockway*.....					12,334	32,618	19,820	54,149
Long Valley†.....	185,216	469,679	201,699	514,442	149,943	380,357	150,837	376,050
Meyers.....	132,350	351,376	121,354	322,816	97,542	262,979	88,213	234,085
Topaz†.....	114,917	301,127	110,108	290,523	93,149	243,606	74,898	189,201
Truckee.....	488,722	1,525,727	486,489	1,472,553	417,682	1,158,385	401,174	1,085,754
Woodfords.....	5,849	15,851	7,424	19,694	4,850	12,997	6,669	17,696
Totals.....	3,835,242	10,404,018	3,758,321	10,281,015	3,374,920	9,111,933	3,046,386	8,226,976

* Discontinued. Combined with Truckee Station.

† Effective January 1, 1954, the name of the Peavine Station was officially changed to Long Valley and the name of the Coleville Station was changed to Topaz.

With the continued increase in travel, we find a comparable increase in interceptions. During 1953 a total of 88,837 lots of plant material was intercepted in violation of provisions of the Agricultural Code; 91,610 lots were intercepted during 1954.

Lots found in violation of specific state quarantines are described as follows:

Quarantine	Lots	Quarantine	Lots
Chestnut bark disease.....	56	Oak wilt.....	38
Cherry fruit fly.....	3,769	Ozonium root rot.....	5,342
Citrus pests.....	13,278	Peach mosaic.....	5
Citrus white fly.....	452	Peach tree diseases.....	6
Colorado potato beetle.....	154	Peach wart.....	9
Cotton insects.....	6,346	Persimmon pests.....	15
Elm tree diseases.....	89	Plum curculio and apple maggot.....	54,252
European corn borer.....	1,658	Sweet potato weevil.....	864
Filbert blight.....	3		
Khapra beetle.....	23	Total.....	86,371
Nut tree insects.....	12		

Number of lots refused admittance under federal quarantines:

Quarantine	Lots	Quarantine	Lots
Black stem rust.....	159	Pink bollworm.....	24
Gypsy and brown-tail moth.....	69	White fringed beetle.....	339
Japanese beetle.....	663	White pine blister rust.....	69
Mexican fruit fly.....	3		
		Total.....	1,326

Number of lots refused admittance under the Agricultural Code:

Miscellaneous infested or infected material—3,874 lots.

A total of 32,901 lots of disease, weed and insect pests were taken during 1954, about a 30 percent increase over 1953. Living insects totaled 20,651 lots, diseases, 10,851 lots, and weed seeds, 1,399 lots.

The list below shows the number of times some of the more important quarantined insects were intercepted:

Apple maggot	404	European corn borer	89
Cherry fruit fly	329	Plum curculio	95
Citrus white fly	31	Sweet potato weevil	25
Cotton boll weevil	22		

Many intercepted insects are not under direct quarantine but might prove costly to eradicate or control.

Following is a list of pests intercepted which, although not specifically covered by quarantine, are of economic importance. This list is arranged alphabetically with data of host and origin:

COLEOPTERA

	Host	Origin	Times
<i>Chalcodermus aeneus</i> , Cowpea curculio	Blackeyed peas	Louisiana	1
<i>Curculio auriger</i> , Chestnut weevil	Chinquapin	Texas	1
<i>Phyllophaga ephilida</i> , a scarab beetle	Soil	Missouri	1
<i>Typophorus viridicyaneus</i> , Sweetpotato leaf beetle	Sweetpotato	Kansas	3
<i>Zygogramma conjuncta</i> , a leaf beetle	Wheat	Utah	1

DERMAPTERA

	Host	Origin	Times
<i>Euberollia cincticollis</i> , African earwig	Apple	Alabama	1
	Gardenia	Mississippi	1
	Peach	New Mexico	1
	Soil	Tennessee	1
	Unid. plants	Texas	1
	Corn	Iowa	1

DIPTERA

	Host	Origin	Times
<i>Rhagoletis suavis</i> , Walnut husk maggot	Walnut	Louisiana	1

HOMOPTERA

	Host	Origin	Times
<i>Acutaspis tingi</i> , Coconut acutaspis scale	Coconut	Mexico	1
<i>Ceroplastes floridensis</i> , Florida wax scale	Gardenia	Louisiana	1
<i>Chionaspis furfura</i> , Scurfy scale	Apple	Kansas	1
		North Carolina	1
<i>Coccus acuminatus</i> , Acuminate scale	Gardenia	Florida	1
<i>Diaspidiotus ancylus</i> , Putnam scale	Apple	South Carolina	1
<i>Hemiberlesia howardi</i> , Howard scale	Holly	Arkansas	1
<i>Lepidosaphes camelliae</i> , Camellia scale	Camellia	Florida	1
		Arkansas	1
<i>Pinnaspis strachani</i> , Lesser snow scale	Limes	New Mexico	4
	Coconuts	Florida	1
	Coconuts	Mexico	7
	Orange	Canada	1
<i>Protopulvinaria pyriformis</i> , Pyriform scale	Unid. plant	Florida	1
	Gardenia	Louisiana	1
<i>Pseudopalatoria parlatorioides</i> , Armored scale	Avocado	Mexico	1
<i>Quadraspidiotus forbesi</i> , Forbes scale	Apples	Kansas	2
		Michigan	4
		Minnesota	3
		Missouri	7
		Mississippi	1
	Pears	New Mexico	1
		Texas	1
	Tangerines	Mississippi	1

	Host	Origin	Times
<i>Tetraleurodes mori</i> , Mulberry whitefly	Holly	Virginia	1
		Texas	1
<i>Unaspis yanonensis</i> , Yanone scale	Tangerines	Canada	2
		Oregon	2
		Washington	2
		Oranges	2
	Japanese oranges	Canada	3

HYMENOPTERA

	Host	Origin	Times
<i>Wasmannia auropunctata</i> , Little fire ant	Coconut	Florida	1

LEPIDOPTERA

	Host	Origin	Times
<i>Diaphania nitidalis</i> , Pickleworm	Squash	Florida	4
<i>Diatraea grandiosella</i> , Southwestern corn borer	Corn	Iowa	1

Cooperative activities were carried on for 31 agencies of the State or Federal Government; 28,569 inbound and 59,313 outbound trucks hauling produce were inspected for compliance with fruit and vegetable standardization regulations. The heavy movement of produce and grain by truck increased the work load at most of the larger stations.

Arrangements were made for the purchase of a site for a new station at Alturas. Plans for this station are complete and the project should be completed in 1955. A realignment of the highway between Yuma, Arizona, and Winterhaven, California, requires a relocation of the Fort Yuma Border Station. Funds were appropriated for the purchase of a new site approximately five miles west of the present station. Funds were also provided for a new modern station on this site. It is anticipated that the new Fort Yuma Station will be completed in 1955.

INTERIOR (COUNTY) INSPECTION

Inspection of plants and plant products at mail, express, truck, rail freight and air terminals at interior points is a very important phase of plant quarantine enforcement in California. These inspection points are covered by the county agricultural commissioners and their inspection staffs, except in the Cities of San Francisco, San Pedro and San Diego. Interstate shipments to these three cities are inspected by personnel of state-operated maritime port stations.

All commissioners, deputies and inspectors holding valid certificates of qualification are state plant quarantine officers. In addition to enforcing the laws, rules and regulations relating to plant quarantine, they certify to the pest conditions or treatments of California products, when such certification is required as a condition of movement within this State, or when required by other states or foreign countries.

An analysis of the summary of inspection, listed by the following chart, compiled from reports by the agricultural commissioners and state-operated stations, shows that 217,652 shipments from other states comprising 68,511,234 plants or units were inspected at interior points. Of these, 207,551 shipments representing 67,638,851 plants or units were found to be pest-free and were otherwise admissible; 10,101 shipments representing 872,383 plants or units were rejected because of agricultural pests or failure to meet quarantine requirements.

The summary of intercounty shipments inspected by agricultural commissioners shows that 110,708 shipments comprising 239,357,390 plants or units were inspected at terminal and destination points. Of these, 109,335 shipments representing 238,501,868 plants or units were passed; 1,373 shipments representing 855,522 plants or units were rejected because of pests or for noncompliance with quarantine regulations.

Interstate shipments inspected decreased 7.7 percent, compared with 1953, also, the number of rejections decreased 12 percent.

Intercounty shipments also fell off 8.8 percent while the number of rejected shipments fell off only 3.9 percent compared with 1953. A larger number of nurseries in the State are participating in the intercounty nursery stock program, thus eliminating need for destination inspection.

This program contributes to at least in part, the decrease in shipments inspected.

Inspection of 73,944 empty railroad cars disclosed 1,854 cars contaminated with cottonseed of undetermined origin and 610 fouled with various other contaminating material, such as corn cobs and seeds of various noxious weeds, requiring cleaning, steaming or fumigation prior to reuse.

Important insect pests intercepted included live citrus white fly, Khapra beetle, European corn borer, raspberry gall forming wasp, apple maggot, plum curculio, rhododendron white fly, cotton boll weevil, sweetpotato weevil, pickle worm, southern army worm, southwestern corn borer, hickory shuckworm, plus a number of scale insects and mealy bugs. Ozonium root rot and red stele disease were intercepted on plants moving intercounty. Animals intercepted included nutria, flying squirrels, and eastern chipmunks, and jack rabbit.

CHART NO. 2

County	INTERSTATE				INTRASTATE			
	Ship- ments passed	Plants or units passed	Ship- ments rejected	Plants or units rejected	Ship- ments passed	Plants or units passed	Ship- ments rejected	Plants or units rejected
Alameda.....	12,753	3,457,710	114	12,076	6,306	11,906,479	8	1,187
Amador.....	188	4,788			77	6,517		
Butte.....	2,411	176,056	64	3,356	1,159	878,548	50	6,953
Calaveras.....	167	8,939			174	28,939	1	2
Colusa.....	238	11,907			394	81,307	1	374
Contra Costa.....	3,612	1,216,318	48	307	2,475	1,469,584	1	37
Del Norte.....	552	29,616	4	24	143	8,347		
El Dorado.....	580	23,223	3	98	128	25,433		
Fresno.....	1,639	163,012	4	43	5,636	1,906,168	13	395
Glenn.....	459	19,059	2	2	402	50,449	14	157
Humboldt.....	2,941	425,262	44	1,038	2,000	318,057	27	6,722
Imperial.....	1,441	122,165	630	19,243	302	45,787	12	588
Kern.....	3,732	521,394	51	1,123	4,427	1,024,635	43	543
Kings.....	304	2,304	1	3	138	103,928	1	13
Lake.....	459	17,143	6	9	292	24,978	2	65
Lassen.....	541	14,084	3	22	209	31,983		
Los Angeles (Co.).....	69,682	3,951,602	5,917	91,663	13,037	3,390,126	267	32,994
*San Pedro (Sta.).....	6,583	1,135,390	17	250				
Madera.....	662	20,109	3	10	436	1,035,972		
Marin.....	2,047	160,326	7	16	1,372	481,712	1	1
Mendocino.....	1,536	61,008	6	13	840	38,762	7	27
Merced.....	606	308,933	8	13	521	363,835	6	10,069
Modoc.....	349	12,511	3	1,100	121	72,755	1	250
Monterey.....	1,632	387,718	19	107	979	2,410,750	47	22,318
Napa.....	711	230,829	5	48	1,220	946,117		
Nevada.....	44	464			459	23,024		
Orange.....	3,572	851,214	431	2,485	7,183	3,452,436	48	400,110
Placer.....	905	339,101	9	549	519	200,124	5	6,519
Plumas.....	142	25,647	1	3	93	38,103		
Riverside.....	3,547	1,306,328	258	134,820	3,664	2,139,862	91	63,549
Sacramento.....	7,375	1,880,504	56	3,927	4,827	28,491,793	10	843
San Benito.....	173	6,286	1	10	126	417,283	16	35
San Bernardino.....	5,965	1,481,450	1,178	424,877	3,885	1,394,369	89	18,917
San Diego (Co.).....	3,194	1,588,329	279	3,056	5,536	2,163,502	26	281
*San Diego (Sta.).....	6,645	223,799	107	339				
San Francisco (Co.).....	3	2,750			970	191,559		
*San Francisco (Sta.).....	24,874	17,441,270	56	6,588				
San Joaquin.....	3,039	543,030	53	1,795	2,211	40,379,872	197	226,516
San Luis Obispo.....	1,008	173,193			1,463	15,387,285		
San Mateo.....	5,805	5,114,094	81	59,657	5,191	2,580,774	13	1,200
Santa Barbara.....	1,454	684,695	9	40	2,007	2,134,680	5	173
Santa Clara.....	5,706	14,270,582	86	15,013	4,466	52,226,284	37	5,765
Santa Cruz.....	1,986	5,668,109	22	41,680	2,310	3,910,149	3	40,602
Shasta.....	1,277	48,190	28	1,252	478	51,621	3	104
Siskiyou.....	1,634	222,075	18	1,009	338	120,277		
Solano.....	2,586	991,439	27	3,415	1,466	8,121,182		
Sonoma.....	2,838	267,850	91	435	1,609	301,656		
Stanislaus.....	2,279	183,142	269	1,458	1,332	690,105	31	1,829
Sutter.....	695	42,258	22	1,069	1,278	5,027,398	74	1,037
Tchama.....	791	22,438	3	2,225	503	358,520		
Tulare.....	1,228	73,735	2	49	1,911	942,274	6	371
Tuolumne.....	9	316			87	14,690		
Ventura.....	1,630	1,673,189	31	35,171	9,981	19,348,046	107	4,501
Yolo.....	781	16,862	1	1	2,174	19,515,840		
Yuba.....	541	15,106	23	896	500	2,227,992	110	475
Totals.....	207,551	67,638,851	10,101	872,383	109,335	238,501,868	1,373	855,522

* State-operated inspection stations.

NURSERY SERVICE

Regulation of the sale and handling of nursery stock through licensing and inspection of nurseries seeks to protect California's agriculture from introduction and spread of detrimental plant pests. Farmers depend upon California nurseries to supply them with fruit and nut trees, grape vines, berry and vegetable plants for replacements or new plantings. To supply this demand, nurserymen produced in 1954 over 4,500,000 deciduous fruit and nut trees, 380,000 tropical and subtropical trees, 800,000 citrus, 4,000,000 grape vines and many million berry and vegetable plants. Good quality stock free of pests betters the farmer's chance of success. Production of ornamentals combined with fruit, nut and vegetable stock makes California the leading state in value of nursery stock grown.

Plant Pest Inspections in Nurseries

In assisting county agricultural commissioners with inspection of nurseries to provide uniformity of inspection procedures throughout the State, added emphasis was placed on the search for plant diseases and nematodes which might be carried by nursery stock. As more became known about these pests, improved methods of inspection were developed. Visual symptoms are sometimes lacking which necessitates laboratory examination for nematodes and indexing to susceptible host plants to detect virus diseases.

Root samples were taken from strawberry nurseries, prior to digging time, for examination in the laboratory for root lesion and root knot nematodes. A number of infestations were found by this method which were not visible in the field. The spring dwarf nematode, *Aphelenchoides fragariae*, was found during January in several locations where runner plants were being harvested from commercial strawberry fields for sale as nursery stock. Because this pest is capable of causing serious damage, infested fields were placed under hold order. The pest was found in only one strawberry nursery, a state-wide survey showed in late spring. Red stele developed in two nursery plantings, during the fall following cool wet weather favorable to the disease. Aster yellows was more prevalent in certain varieties than in previous years.

The inspection of deciduous fruit and grape vine nursery stock, in 71 nursery growing grounds totaling 535 acres, resulted in finding 19 different virus diseases or virus-like disorders. Plants found infected with peach calico, peach stunt, "mule ears" of peach and grape mosaic were destroyed. Plants not true to variety were also pointed out to the nurserymen. Nursery Service also assisted the Bureau of Plant Pathology in inspections for virus diseases in budwood and cutting wood sources used for propagation. There was increased interest in this service, and more nurserymen took advantage of it.

Burrowing nematode, *Radopholus similis*, which causes "spreading decline of citrus" in Florida, was first found in a California nursery on banana plants imported from Hawaii. A nursery survey of ornamental host plants was started in cooperation with county agricultural commissioners and the Bureau of Plant Pathology. The pest was found in 13 locations, all in Southern California.

Regular inspections of all blocks of stock in nurseries, followed by reinspections to determine that infestations were properly cleaned up, not only kept common pests under effective control but also held in check the establishment and spread of new or serious pests. The following list shows that county and state inspectors found 181 infestations of 26 different pests at nurseries in 25 counties.

Pests	Counties where found in	No. of infestations
<i>Aphelenchoides fragariae</i>	Stanislaus -----	6
Spring dwarf nematode	Butte -----	1
<i>Asterolecanium arabidis</i>	Alameda -----	4
Pittosporum pit-making scale	Contra Costa -----	6
	Fresno -----	1
	Marin -----	3
	San Francisco -----	1
	San Mateo -----	5
	Santa Clara -----	10
	Santa Cruz -----	2
	Sonoma -----	4
	Stanislaus -----	4

<i>Pests</i>	<i>Counties where found in</i>	<i>No. of infestations</i>
<i>Chionaspis americana</i> Elm scurfy scale	Orange -----	1
<i>Clavaspis herculeana</i> Scale insect	Ventura -----	1
<i>Chionaspis gleditsiae</i> Honey locust scale	Los Angeles -----	1
<i>Dynaspidiotus britannicus</i> Holly scale	Alameda -----	1
	Contra Costa -----	1
<i>Furcaspis biformis</i> Scale insect	Ventura -----	1
<i>Heilipus lauri</i> Avocado seed weevil	Los Angeles -----	1
<i>Lecanium kunoensis</i> Kuno scale	Contra Costa -----	2
<i>Lepidosaphes camelliae</i> Camellia scale	Los Angeles -----	1
	San Diego -----	1
<i>Parlatoria oleae</i> Olive scale	Alameda -----	1
	Fresno -----	19
	Kern -----	14
	Kings -----	9
	Los Angeles -----	4
	Madera -----	5
	Merced -----	7
	Napa -----	1
	Placer -----	1
	San Joaquin -----	2
	Stanislaus -----	4
	Tulare -----	8
<i>Parlatoria pittospori</i> Scale insect	San Diego -----	16
<i>Parlatoria proteus</i> Scale insect	Los Angeles -----	1
	San Mateo -----	1
<i>Phenacaspis fujicola</i> Scale insect	San Diego -----	1
<i>Phenacaspis sandwicensis</i> Scale insect	Alameda -----	1
<i>Pinnaspis strachani</i> Lesser snow scale	Alameda -----	1
<i>Pseudococcus</i> sp. a new and undescribed mealy bug	Marin -----	1
<i>Pulvinaria psidii</i> Green shield scale	Los Angeles -----	1
	San Mateo -----	1
<i>Radopholus similis</i> Burrowing nematode	Los Angeles -----	11
	Orange -----	2
<i>Rhizoecus</i> sp. a new and undescribed ground mealy bug	Humboldt -----	1
<i>Toumeyella liriiodendri</i> Tulip tree scale	Orange -----	1
	San Bernardino -----	1
<i>Unaspis euonymi</i> Euonymus scale	Santa Clara -----	1

<i>Virus diseases</i>	<i>Counties where found in</i>	<i>No. of infestations</i>
"Mule ears" of peach	Placer	1
Peach calico	Kern	1
	Merced	1
	Stanislaus	1
Peach stunt	Placer	1
	Sacramento	1
	Sonoma	1

Infested blocks of stock were placed under hold order by county agricultural commissioners until cleaned up. Of these infestations, 76 are still being held to determine the effectiveness of clean-up measures applied.

Noxious weed pests found in nurseries include: Canada thistle in Alameda and Sacramento Counties; hoary cress in Contra Costa, Santa Clara and Sonoma Counties; Klamath weed in Placer County; Quackgrass in Alameda, Contra Costa, Humboldt, Marin, Sacramento, San Francisco, San Mateo, Santa Clara and Sonoma Counties; Russian knapweed in Los Angeles County; white horse nettle in San Bernardino County.

Intercounty Nursery Stock Certificates

More nursery stock moved within California in shipments using these certificates which eliminate the necessity of inspection at destination. Approval to issue these certificates was granted by the director to two additional counties. The number of nurseries authorized to use the certificates totalled 541 firms operating in 666 locations, an increase of over 17 percent in the number of locations compared to the previous year.

Participation in the program is voluntary for both nurserymen and commissioners. Nurseries meeting the strict requirements of plant pest cleanliness may use these certificates on shipments to 56 of the 58 counties in the State.

Citrus Tree Registration

The inspection of citrus trees used as budwood sources and the registration of trees found free of symptoms of psorosis, or scaly-bark, are means of providing nursery stock free of this serious virus disease. The program, which started in 1937, is voluntary, supported by fees paid by participants.

The total number of trees registered decreased again the past season because re-registrations were not requested on 271 trees. Applications for the entry of 84 new trees in the program were received. The registry of trees found free from psorosis published each year includes: 405 Valencia Orange; 118 Washington Navel Orange; 67 Eureka Lemon; 17 Lisbon Lemon; one Eureka Type Lemon; two Marsh Seedless Grapefruit; four Rafferty Lemon; 11 Seedling Lemon; two Frost Nucellar; one Prior Short Thorn Lisbon Lemon; one Navel Nucellar Orange; one Bessey Sweet Orange.

Strawberry Certification and Registration

The number of strawberry plants certified has increased from 1,000,000 plants in 1949-50, when the program began, to 20,734,000 in the 1953-54 season. The demand for certified plants, which have passed the rigid inspections required by the director's regulations, is responsible for the growth of the program, which is voluntary and self supporting.

Three varieties, Marshall, Lassen and Shasta, were certified. The first registry certified strawberry plants were produced. These were grown from plants which had been indexed for virus diseases. One additional grower entered plant beds for the production of certified stock. Assistance was given a number of other prospective applicants in locating ground suitable for certification plantings.

Licensing

The number of licenses to sell nursery stock issued during the 1953-54 Fiscal Year was 2 percent greater than the previous year and a 19 percent increase over 1949-50. The number of sales locations licensed in each of the past five years is as follows:

<i>Fiscal year</i>	<i>Sales location</i>
1949-50	5,420
1950-51	5,978

<i>Fiscal year</i>	<i>Sales location</i>
1951-52	6,484
1952-53	6,328
1953-54	6,472

Approximately 20 percent of 1953-54 licenses was issued to firms which handle nursery stock as a sideline to another business. Packaged roses, bulbs and bedding plants are most commonly handled by such firms.

Three firms were investigated for fraud or misrepresentation in the sale of nursery stock; all three discontinued business. The activities of one was referred to the United States Post Office Inspector and United States Attorney for investigation and possible criminal action.

A number of complaints concerning misleading advertising were investigated; advertising found to be false was corrected. Most misleading advertising statements were made about roses.

Grade and Standards

Investigations were made of seven complaints filed with Nursery Service stating that nursery stock received or being offered for sale did not comply with the nursery stock grades and standards law. Four of these complaints were withdrawn when adjustments were made by the shipper. Sufficient evidence for prosecution was lacking in two cases. Investigation of one complaint showed there was no violation.

A number of instances of mislabeling were found during inspection of packaged roses for dead and dying plants. A total of 181 sales locations were inspected, and dead or dying stock was found in 74 of these. Approximately 13 percent of packaged roses inspected during the season were found to be dead or dying. Firms were required to remove this stock from sale. Cases of mislabeling were also corrected.

Other Services

The Directory of Nurserymen and Others Licensed to Sell Nursery Stock in California was published and distributed to licensees.

Several meetings were held in cooperation with the Bureau of Plant Pathology and staff members of the University of California, Los Angeles, Berkeley and Davis, to familiarize county agricultural inspectors and nurserymen with disease symptoms.

The motion picture "Nursery Practices in California" and colored slides of plant diseases and insect pests were also used as part of our training program for county inspectors.

Assistance was given the United States Department of Agriculture with inspections in nurseries requesting certification of varieties of Mahonia and barberry plants, as required by the federal black stem rust of wheat quarantine.

Each year, through the cooperation of growers, a census of fruit and nut trees and vines grown in California is prepared and distributed. A census for the 1953-54 season follows:

FRUIT AND NUT TREES AND VINES

	One-year	Older	June buds	Fall buds
Deciduous fruit trees				
Apple	116,000			150,000
Apricot	258,000		4,000	333,000
Cherry	162,000			198,000
Nectarine	101,000		304,000	119,000
Peach, canning cling	153,000	2,000	554,000	149,000
Peach, shipping varieties	379,000		671,000	417,000
Pear on pear	160,000		1,000	188,000
Pear on quince (dwarf)	22,000	2,000		25,000
Plum	276,000	1,000	58,000	363,000
Prune	298,000	17,000	14,000	422,000
Quince	7,000		6,000	16,000
Other kinds, fruit trees	142,000	4,000	5,000	68,000
Totals	2,074,000	26,000	1,618,000	2,448,000
Nut trees				
Almond	208,000	4,500	140,000	209,000
Black walnut, seedlings	198,000	15,000		
Walnut (English), budded	128,000	13,000		
Other kinds, nut trees	43,000	41,000		
Totals	577,000	73,500	140,000	209,000

	One-year	Older	Seedling rootstocks
Tropical and subtropical fruits			
Avocado.....	130,000	33,000	130,000
Fig.....	103,000	49,000	
Olive.....	31,000	26,000	
Other kinds.....	5,000	3,000	2,000
Totals.....	269,000	111,000	132,000

	All
Grapevines	
Raisin varieties.....	1,189,000
Juice, wine varieties.....	319,000
Shipping, table varieties.....	2,151,000
Eastern varieties.....	106,000
Grafted, all varieties.....	69,000
Rootstock varieties, rooted.....	337,000
Total.....	4,171,000

	One-year buds (Spring 1954, Summer 1953)						Two-year and older
	On-sweet	Sour	G.F.	R. Lem.	Tang.	Other	
Citrus fruit trees							
Washington Navel orange.....	44,000	6,000		20,000	1,000	37,000	33,000
Valencia orange.....	32,000	2,000	1,000	12,000		19,000	24,000
Mandarin, Tangerine, etc.....	12,000			5,000		9,000	6,000
Eureka lemon.....	111,000		6,000	35,000	9,000	17,000	10,000
Meyer lemon.....	5,000			4,000	1,000	5,000	4,000
Other lemons.....	110,000	9,000	4,000	22,000	10,000	39,000	2,000
Marsh grapefruit.....	19,000		2,000	17,000		3,000	2,000
Limes.....	6,000			6,000	2,000	2,000	1,000
Miscellaneous citrus.....	57,000			3,000		6,000	4,000
Totals.....	396,000	17,000	13,000	124,000	23,000	137,000	86,000

	Seedbed	Lined out
Citrus rootstock		
Sweet stock.....	731,000	374,000
Sour stock.....	75,000	30,000
Grapefruit.....	16,000	10,000
Rough lemon.....	209,000	240,000
Mandarin.....	289,000	132,000
Tangelo.....	48,000	44,000
Trifoliata.....	12,000	36,000
Troyer.....	54,000	75,000
Other rootstocks.....	14,000	7,000

BUREAU OF PLANT PATHOLOGY

GILBERT L. STOUT, *Chief*

Plant pathology problems during 1954 continued to include a wide variety of diseases and disease situations. Among new pests not previously reported in California was the burrowing nematode, *Radopholus similis*, found on certain imported ornamental plants growing in containers but not in established plantings. Progress was made during the year in strengthening procedures for detection of virus diseases in imported plant materials by means of transmission test indexing methods. This is very important in the case of serious viruses which can be latent or symptomless in tolerant host plants and therefore undetectable, in such plants, by visual inspection; it is especially true in the case of dormant plant parts such as cuttings or budsticks from woody plants. With the cooperation of the United States Department of Agriculture, the California Department of Agriculture, the University of California and the agricultural industries concerned, procedures are now operating in California for applying index test methods for virus diseases to imported grapevines and citrus plants. Similar procedures for imported *Prunus* species are being developed.

Technical assistance in plant pathology problems was given during the year to other Department of Agriculture bureaus, especially in plant quarantine matters, strawberry plant certification and seed potato certification.

Detailed reports on various activities and projects of this bureau are given below by the technical personnel concerned.

PERMANENT SURVEYS IN COOPERATION WITH COUNTY AGRICULTURAL COMMISSIONERS

By GEORGE E. ALTSTATT, *Assistant Chief of Bureau*; CARL W. NICHOLS, *Associate Plant Pathologist*; ROY M. NAKAYAMA, *Assistant Plant Pathologist*

The permanent survey for detection of new plant diseases while in their incipient stages was continued during 1954. In addition to general surveys of fruit, vegetable and field crops, survey pathologists assisted in a number of special survey problems. These included inspection of grapevines and grapevine nursery stock for virus diseases, strawberry plantings for nematode and virus diseases and citrus and stone fruit trees for virus diseases. This work is included in these survey reports.

The functions of permanent survey personnel include training of state and county personnel for inspection and survey procedures and coordination of county work when several of the counties are involved in a particular disease problem.

INTERNAL CORK OF SWEET POTATO. This virus disease of sweet potatoes is characterized by the presence of small necrotic areas surrounded by a layer of cork cells in the internal tissues of the fleshy roots. Examinations of roots in fields and in storage during 1953 revealed the presence of internal cork in several San Joaquin Valley counties. During January and February, 1954, the disease was found for the first time in stored potatoes (1953 crop) grown in Orange and Riverside Counties.

ANGULAR LEAF SPOT OF COTTON. Inspections revealed this disease in the 1953 cotton crop in Fresno, Kern, Madera and Tulare Counties, only in cotton irrigated by overhead sprinklers. A limited survey of cotton fields during 1954 showed the disease to be prevalent in three of four previously infected fields in Fresno County and two in Kern County. These fields were all overhead irrigated. No infection was found in the Madera County field reported infected in 1953; the field subsequently was replanted and furrow irrigated during 1954.

No angular leaf spot was found in 17 furrow irrigated plantings inspected in Merced County or in four overhead irrigated fields, inspected in Kern County, which did not have cotton last season.

ALMOND SCAB. Almond scab, a disease caused by a species of the fungus *Cladosporium*, recently was found to be of economic importance in several almond orchards in certain California areas. Symptoms consist of olive to black, small, circular to oblong lesions on leaves, hulls and twigs. The causal fungus may be the

same as the one responsible for scab disease on peach and other stone fruits (*C. carpophilum* Thum.); however, apricot, cherry, nectarine, peach and plum trees growing in and near almond scab infected orchards have not shown symptoms of the disease.

A survey of almond orchards in the Sacramento Valley was made, in cooperation with the Department of Plant Pathology, University of California at Davis. Scab infected almond trees were found on 40 of the 105 properties inspected in eight out of ten counties surveyed. Infected trees were found in Butte, Colusa, Glenn, Sacramento, Sutter, Tehama, Yolo and Yuba Counties. No infected trees were found on properties examined in Contra Costa or Solano Counties. The disease occurred on all varieties of almonds inspected but appeared to be most severe on Ne Plus Ultra and Smith I. X. L. varieties. It usually was more severe in lower and wetter parts of an orchard.

BROOMRAPE. Further surveys were conducted by the Alameda County Department of Agriculture to determine current distribution of branched broomrape, *Orobanche ramosa* L., in that county.

Tomato fields on 125 properties, totaling about 2,600 acres, were examined; broomrape was found on 15 properties comprising approximately 340 acres. Two additional properties previously found infested developed broomrape when replanted to tomatoes this year. Broomrape is now known to have occurred in 29 fields, all in Washington Township, Alameda County, since it was first reported there during 1929. It has not been found elsewhere in California.

The weed, hairy night shade (*Solanum sarachoides* Sendt.), was found parasitized by broomrape in a field recently planted to corn. Tomatoes had been parasitized by broomrape in this field during 1953.

BACTERIAL SPOT OF BROCCOLI. This disease, which is favored by cool wet weather, often following frosts, has been seen in the field in San Luis Obispo and Orange Counties, where it causes lesions of leaves and stems. Floret infection is found in the field only under very humid conditions but may develop in transit.

Symptoms of bacterial spot of broccoli, caused by *Pseudomonas maculicola* (McCulloch) Stevens, appear as purplish-gray to black lesions, up to one millimeter in diameter, on broccoli florets, leaves, stems and petioles. Lesions on leaves viewed by transmitted light show a dark center surrounded by a halo.

DEAD ARM DISEASE OF GRAPES. During the late summer of 1954, a condition in a planting of Thompson Seedless grapes, in the Livingston area of Merced County, was called to our attention by W. B. Hewitt of the University of California, Davis. He had diagnosed the condition as dead arm disease, caused by the fungus *Cryptosporella viticola*. Although this disease is not new in California, it had not been known to occur in the San Joaquin Valley south of the Lodi area, San Joaquin County, prior to 1954.

A limited survey, by spot inspections of grape plantings on the Merced County property as well as on adjacent properties and others in the general area, was made by state and county personnel during October, 1954. Inspections on 12 properties showed the disease present only on the original and an adjacent property in the Livingston area and on a property in the Cortez area. Among the 15 varieties inspected, the disease was found on Thompson Seedless, Mission, Valdepenas, and Tokay varieties.

In most plantings infections were light and on scattered vines only. One planting of the Thompson Seedless variety was severely infected with pronounced symptoms appearing as a bunch rot of the fruit and dark colored cankers generally toward the base of the canes. Moisture is necessary for infection, and it is presumed that infection of these parts had taken place during spring rains after new growth had been made. Infection apparently is retarded during the hot, dry summer months.

ASTER YELLOWS. A survey of 123 strawberry plantings in 17 counties showed western aster yellows present in 28 plantings throughout 11 counties: Alameda, Fresno, Los Angeles, Merced, Monterey, Orange, San Bernardino, San Joaquin, Santa Barbara, Santa Clara and Stanislaus. No infection was noted in Madera, Riverside, San Diego, San Luis Obispo, Santa Cruz or Ventura Counties. In addition Nursery Service inspectors collected infected plants from six properties in Tehama County and one property in Shasta County. Generally field infection was only a trace, although one Monterey County property had a 1 percent infection; another in Santa Barbara County had a 3 percent infection. Most of the infected plants were of the Lassen variety.

Symptoms suggestive of aster yellows virus infection were seen in a Colusa County 25-acre field of yellow crookneck squash and subsequently on pumpkin in Sutter County. A late commercial planting of Yolo County tomatoes showed an unusual condition, during September, which suggested infection by curly top virus, although symptom expression was more-or-less limited to the plant's upper portion. Transmission tests, with vectors of aster yellows virus, undertaken by J. H. Freitag of the University of California, showed that squash, pumpkin and tomato plants were infected with the aster yellows virus. He also reported negative attempts to transmit curly top from the Yolo County tomato plants.

POSTENTRY INSPECTIONS. Under Federal Nursery Stock, Plant and Seed Quarantine No. 37, certain foreign plants may be imported if the importer agrees to certain conditions, including a quarantine detention period during which state and federal authorities make inspections. Such inspection is one of the functions of this bureau.

A total of 59 lots of plants or plant material was imported into California during 1954. Among these lots were 336 seedlings; 788 cuttings, scions, or budsticks; and 2,082 plants. All of these plants will receive inspections during the detention period, after which those free of disease are eligible for release.

PEACH MOSAIC

By R. L. McClain, Associate Plant Pathologist

The federal, state and county cooperative peach mosaic project was continued in Southern California to suppress the mosaic disease in the infected area and prevent spread. Inspections were made in Los Angeles, Orange, Riverside, San Bernardino and San Diego Counties; mosaic-infected trees were found in all but Orange County.

Inspections were made of 460,697 peach trees, 378,012 of which were inside the area under quarantine and 82,685 outside the area. A second inspection was made of 130,339 of these trees, nearly all of which were in the quarantined area. In nursery sales yards and growing grounds, an additional 47,891 peach mosaic host trees were inspected within the quarantined area and 78,950 outside the area. There were 1,037 mosaic trees found on 315 properties, of which 914 were seen on 310 properties during the first inspection and 123 on 54 properties during the second inspection. Two properties in Riverside County and three in San Bernardino County were found infected on second inspection but not on the first. All mosaic trees found were removed. Except in one instance, where two mosaic trees were found near a block of peach nursery stock later removed prior to nursery inspections, no mosaic trees were found in the immediate environs of nursery growing grounds; none was found on premises of nurseries and dealers handling peach mosaic host plants.

The number of properties and trees inspected and the number of properties and trees found infected, by counties, is shown in Table 1. The single mosaic tree found in Los Angeles County was in the Valyermo district of Antelope Valley, outside the quarantined area and approximately 25 miles from the nearest previously known mosaic infection. No other mosaic trees were found outside the quarantined area.

TABLE 1¹

Summary by Counties of Peach Mosaic Inspections in Southern California for 1954

County	Inspected		Infected with Mosaic		
	Properties	Trees	New properties	Total properties ²	New cases (trees)
Los Angeles.....	8,514	89,549	1	1	1
Orange.....	1,599	4,832	0	0	0
Riverside.....	2,463	131,544	17	188	768
San Bernardino.....	4,432	195,433	24	114	222
San Diego.....	183	39,339	1	12	46
Totals.....	17,191	460,697	43	315 ³	1,037

¹ Figures compiled by U. S. Department of Agriculture.

² Includes properties infected in previous years and having new tree cases in 1954.

³ Includes two properties in Riverside County and three in San Bernardino County infected on second inspection of the season but not on the first inspection.

TABLE 2¹

Summary by Years of Peach Mosaic Inspection in Southern California for 1936 Through 1954

Year	Inspected		Infected with mosaic		
	Properties	Trees	New properties	Total properties ²	New cases (trees)
1936	1,817	499,970	922	922	28,897
1937	20,414	750,689	574	1,258	34,239
1938	51,184	875,039	637	1,487	17,847
1939	54,033	736,448	479	1,410	8,372
1940	49,295	679,981	374	1,114	4,720
1941	55,221	653,045	270	856	3,994
1942	20,403	466,420	118	503	1,219
1943	6,870	396,574	54	410	1,113
1944	3,476	490,483	77	415	1,657
1945	5,680	505,278	106	348	1,062
1946	11,558	536,147	54	308	914
1947	11,212	573,979	49	205	729
1948	13,148	546,694	118	355	1,318
1949	16,032	497,794	207	570	2,527
1950	20,653	490,871	162	535	1,859
1951	17,854	477,213	236	621	2,470
1952	19,452	470,384	125	523	1,971
1953	19,562	451,597	63	345	1,048
1954	17,191	460,697	43	315	1,037
Totals ²	(415,055)	(10,559,253)	4,677	-----	116,993

¹ Statistics compiled by U. S. Department of Agriculture.² Figures in parentheses include duplications.³ Includes properties infected in previous years and having new tree cases in the year represented.

Table 2 shows results of the mosaic inspections in Southern California, from beginning of the work during 1936 to and including 1954. Results of 1954 inspections indicate a continuation of the trend in the incidence of mosaic which has existed since 1942. There was a decided drop in incidence until 1941, following which the number of new diseased trees found per year remained relatively low, yet fluctuated.

Orchard inspections were started April 25; the first inspection in the quarantined area was completed June 30, the second inspection started June 4 and was completed July 8. Inspections outside the quarantined area were completed August 6.

Inspections in the area under quarantine included all commercial peach orchards, dooryard plantings near such orchards, environs of all growing grounds where peach mosaic host plants were being propagated and the sales premises of nurseries and dealers. In Riverside County a complete inspection was made of the Calimesa and Beaumont-Banning areas and the commercial orchards and their environs in the Elsinore-Temecula area. In San Bernardino County a complete inspection was made of the Yucaipa area and the commercial orchards and their environs in the Ontario and Lytle Creek districts. In San Diego County only commercial orchards and their immediate environs were inspected. In the quarantined area of Los Angeles County all commercial orchards and their environs received inspection.

Inspections outside of the quarantined area included all peach trees along the west and south boundaries of the area within a zone five to ten miles wide in Los Angeles County and two to five miles wide in Orange County. They also included commercial peach plantings in San Fernando and Antelope Valleys of Los Angeles County.

The second inspection for the season was made on properties found infected during the first inspection in the Bannings Heights and Cherry Valley districts of Riverside County, the Yucaipa, Ontario and Lytle Creek districts of San Bernardino County and the Valermo district of Los Angeles County. In Riverside County these inspections covered 81,073 trees on 162 properties; 96 additional mosaic trees were found there on 38 properties; in San Bernardino County inspections covered 48,054 trees on 110 properties, and 27 mosaic trees were found on 16 properties; in Los Angeles County 1,212 trees on one property received the second inspection, but no additional mosaic trees were found.

The Plant Pest Control Branch, Agricultural Research Service of the United States Department of Agriculture, provided general administration and local supervision of the work, a project office at Riverside, supplies and equipment including automobiles and trucks and approximately 14 man-months of inspection personnel.

The California Bureau of Plant Pathology provided technical assistance, clerical help, partial transportation costs and travel expenses for inspection personnel and salaries of inspectors for approximately 17 man-months. County departments of agriculture paid the salaries of inspectors for 21 man-months and assisted in the regulatory and law enforcement features of the program.

Plant pathologists of this bureau continued to assist with the supervision of several plots maintained by fruit breeders to test stock of new stone fruit varieties for freedom from peach mosaic virus, prior to release for movement to points outside of the peach mosaic quarantined area.

In addition to the Southern California peach acreage covered under this project, peach plantings in 12 counties north of the Tehachapi Mountains were inspected for virus diseases, including yellow leaf roll, western X-disease and yellow bud mosaic; no peach mosaic was found among 3,126,076 trees inspected on 1,667 properties.

QUICK DECLINE OF CITRUS

By R. L. McCLAIN, *Associate Plant Pathologist*

The state-wide survey of orange plantings for the quick decline disease was continued during 1954. Current information on the natural spread and distribution of the disease was sought in order that quarantine lines might be changed, as necessary, to protect noninfected areas from artificial spread caused by the movement of infected budwood and nursery stock. Inspections were made of approximately 93,000 acres of oranges in the following 14 counties: Butte, Fresno, Glenn, Kern, Los Angeles, Orange, Riverside, Sacramento, San Bernardino, San Diego, Santa Barbara, Santa Clara, Tulare and Ventura. According to the California Crop and Livestock Reporting Service these counties contained 196,373 acres of orange trees or over 99 percent of all California orange trees estimated for 1953.

In the area under quarantine complete surveys were made of all areas defined as regulated (parts of San Diego, Ventura, and Santa Barbara Counties); approximately 70 percent of the acreage was inspected in those areas designated as lightly infected (parts of Los Angeles, Orange, Riverside, San Bernardino and Ventura Counties), but no inspection was made of the heavily infected area (parts of Los Angeles, Orange and San Bernardino Counties). Surveys also were made in all citrus growing areas outside the quarantined area except Imperial County which was surveyed in the previous year.

The 1954 survey showed continuation of the slow progress of the disease in the lightly infected area of Orange and Los Angeles Counties. This was also true in most of the lightly infected San Bernardino County area; in the Bryn Mawr district several previously infected properties were found to have a very high incidence of the disease. In the Highgrove, Riverside and Arlington districts of Riverside County diseased trees were found on numerous properties for the first time, indicating greatly increased activity of quick decline in those areas. The Ventura County survey showed the disease continuing its rapid rate of spread in the Sespe Canyon and Bardsdale districts and making some progress within a radius of several miles east and west of this area. In other parts of the Santa Clara Valley, Ventura County, quick decline was found almost as far east as citrus is grown (within two miles of the Los Angeles County line) and as far west as approximately two miles west of the City of Santa Paula. No diseased trees were found in other parts of the county. In San Diego County a single orange tree showing symptoms of quick decline was found in San Luis Rey Valley, part of the regulated section of the quarantine area. A transmission test on this tree is in progress.

Although no surveys were made in the heavily infected area, reports of county agricultural inspectors and others indicate the disease has continued to spread but not as rapidly as in the original centers of infection (eastern Los Angeles County, western San Bernardino County and northern Orange County).

During surveys outside of the areas quarantined as of September 26, 1954, date of the last quarantine amendment, quick decline was not found in oranges except in Butte County where transmission tests showed two infected Satsuma orange trees, one on each of two properties. These trees, with others, were said to have been brought from Southern California a number of years ago prior to the quarantine. Tests of Satsuma oranges outside of the quarantined area are being continued; thus far there are no indications that this variety is generally infected. Similar tests made from Meyer lemon trees in various parts of California, both inside and

outside of the quarantined area, have shown them generally to be infected even when not showing symptoms. A report on the Meyer lemon situation, which includes results of tests made by members of the University of California and members of this bureau, is being published by J. M. Wallace and R. J. Drake of the University of California Citrus Experiment Station.

Quick decline survey work is a joint project of the Bureau of Plant Pathology and county departments of agriculture. Survey headquarters were maintained at Riverside. The bureau provided general administration of the project, including plant pathologists for technical assistance and seasonal and temporary help for orchard inspection and preparation of maps and records; it also maintained a glasshouse for making diagnostic transmission tests. The counties supplied personnel for orchard inspection and helped to plan and supervise the work. County departments of agriculture and county agricultural extension services assisted in reporting trees suspected of having quick decline disease. Members of the staff of the Department of Plant Pathology, University of California Citrus Experiment Station, assisted with interpretations of laboratory and transmission tests, and at times in making these tests and examination of diseased trees.

Inspection crews usually were composed of both state and county personnel; in most districts inspections were made on an orchard-by-orchard and a tree-by-tree basis, so that all trees in the surveyed areas were seen. State plant pathologists examined all suspect trees and made necessary tests for diagnosis.

During 1954 an estimated 84 man-months were used in the activities of the survey, 34 of which were supplied by the counties and 50 by the State. These figures are estimates of time used in all phases of the work, including local administration, supervision, tree inspection, laboratory and transmission work, technical assistance, preparation of records and reports, stenographic help and travel.

Laboratory tests were made of bark and rootstock samples from 245 trees suspected of having quick decline disease or being symptomless carriers of the virus. Bark examinations are made to determine presence of microscopic symptoms of quick decline in the food conducting and storage tissues (sieve tubes and phloem parenchyma) in the region of the bud union. Rootstock identification tests are made to determine whether trees, showing symptoms suggestive of quick decline, are growing on sour rootstock, which is susceptible to the disease, or on a tolerant rootstock such as sweet orange. Since mature trees on tolerant rootstocks are not known to be visibly affected by the quick decline virus, any trees in decline on such rootstocks can be eliminated as suspects and considered as affected by other causes.

TABLE 3

Estimated Orange Acreages in Relation to Occurrence of the Quick Decline Disease and the Quarantined Area as of December 31, 1954

Based on latest available crop acreage estimates for year 1953

County	Estimated in county for 1953*	Acres of orange trees						
		In quarantined area					Outside quarantined area	
		Heavily infected area	Lightly infected area	Regulated area	Total number of acres	Percent of county acreage	Number of acres	Percent of county acreage
Los Angeles.....	28,474	23,070	5,404	0	28,474	100.0	0	0.0
Orange.....	52,969	50,315	2,654	0	52,969	100.0	0	0.0
Riverside.....	17,121	0	15,417	0	15,417	90.0	1,704	10.0
San Bernardino.....	30,248	8,095	22,153	0	30,248	100.0	0	0.0
San Diego.....	6,278	0	0	260	260	4.1	6,018	95.9
Santa Barbara.....	88	0	0	88	88	100.0	0	0.0
Ventura.....	20,281	0	9,393	10,888	20,281	100.0	0	0.0
Totals for the seven counties.....	155,459	81,480	55,021	11,236	147,737	95.0	7,722	5.0
Totals for all other counties.....	41,802	0	0	0	0	0	41,802	100.0
Totals for the State.....	197,261	81,480	55,021	11,236	147,737	-----	49,524	-----
Percent of state acreage for 1953.....	-----	41.3	27.9	5.7	74.9	-----	25.1	-----

* From Blair, R. E., and Harry Friesen, California Fruit and Nut Crop Acreage Estimates as of 1953. State of California, Department of Agriculture Bulletin 43 (2): 77-104. 1954.

Transmission tests from 99 orchard and dooryard trees were made in the glass-house by inoculating lime seedlings and observing them for symptoms. The transmission test is the most reliable method for diagnosis of quick decline and was used as a standard practice in support of field examinations and laboratory tests of diseased trees found on the survey, particularly in those areas where the disease has not been known to occur.

Estimates of the acreages of oranges, as of December 31, 1954, in the heavily infected, lightly infected and regulated parts of the quarantined areas and outside of the quarantined areas, are shown in Table 3. Approximately 75 percent of the State's acreage is now in the quarantined area. It is estimated that at least 99 percent of all quick decline-affected trees have appeared in that part of the area presently defined as heavily infected; total number of such trees is less than four percent of all orange trees in California.

YELLOW LEAF ROLL OF PEACH

By ARCHIE SCHLOCKER, *Associate Plant Pathologist*

Inspections of commercial peach and nectarine orchards for the virus disease known as yellow leaf roll were made during 1954 in cooperation with the agricultural commissioners in Butte, Contra Costa, El Dorado, Merced, Placer, Solano, Stanislaus, Sutter, Tehama and Yuba Counties. The disease is not known outside of the "peach bowl" area of Butte, Placer, Sutter and Yuba Counties. During 1954 it was not found in Placer County. Altogether, approximately 3,049,894 trees on 1,544 properties were inspected at least once during the season (Table 4). In Butte, Placer, Sutter and Yuba Counties, 1,016,592 of these trees on 392 properties received a second inspection, and 161,744 on 68 properties were given a third inspection. As a result of these inspections 122 new tree cases were found on 40 properties in Butte, Sutter and Yuba Counties (Table 4). All were promptly destroyed under the supervision of county agricultural commissioners. Ninety-four of these infected trees were found on 24 properties with a previous history of the disease; 28 trees were in 16 plantings where yellow leaf roll had not occurred prior to 1954.

Decrease in number of new tree cases, 122 in 1954 compared with 463 found in 1953 and 1,008 in 1952, was very encouraging to the suppression program. Equally encouraging was a reduction in the number of infected properties in 1954, down to 40 from 167 found in 1953 and 96 in 1952. Reference to the five-year summary of inspections for yellow leaf roll of peach in Table 5 shows that the downward trend in the incidence of yellow leaf roll had started in 1953 without a corresponding decrease in the number of infected properties. This year (1954) was the first to show a reduction both in the number of tree cases and in the number of infected properties.

The sharp decline in newly infected properties, from 105 in 1953 to 16 in 1954, indicates a slowing down in the movement or spread of the disease within the affected

TABLE 4

Results by Counties of Inspections for Yellow Leaf Roll of Peach for 1954

County	Inspected		Infected with yellow leaf roll			
	Properties	Trees	New properties	Total properties*	New cases (trees)	Total cases (trees)
Butte.....	193	304,158	5	9	52	52
Contra Costa.....	35	100,895	0	0	0	0
El Dorado.....	31	8,556	0	0	0	0
Merced.....	39	80,768	0	0	0	0
Placer.....	3	22,730	0	0	0	0
Solano.....	128	112,312	0	0	0	0
Stanislaus.....	150	310,496	0	0	0	0
Sutter.....	776	1,664,903	10	23	49	49
Tehama.....	53	72,192	1	8	0	0
Yuba.....	136	372,884	1	8	21	21
Totals.....	1,544	3,049,894	16	40	122	122

* Includes properties infected in previous years and having new tree cases in 1954.

TABLE 5

Five-year Summary of Inspections for Yellow Leaf Roll of Peach

Year	Inspected		Infected with yellow leaf roll			
	Properties	Trees	New properties	Total properties ²	New cases (trees)	Total cases (trees)
1950-----	1,348	1,536,005	30	30	877	877
1951-----	2,104	3,391,424	44	70	1,029	^a 1,543
1952-----	4,043	6,244,662	51	96	1,008	1,008
1953-----	1,962	3,734,228	105	167	463	463
1954-----	1,544	3,049,894	16	40	122	122
Totals ¹ -----	(11,001)	(17,956,213)	246	-----	3,499	-----

¹ Figures in parentheses include duplication.

² Includes properties infected in previous years and having new tree cases in the year represented.

³ Includes 514 cases found in 1950 and still standing at inspection time in 1951.

counties (Table 5). Fluctuations in the incidence of insect borne virus diseases are believed to be correlated positively with the fluctuations of viruliferous insect populations, and also dependent upon the efficiency of the vector or vectors in transmitting the virus to susceptible hosts. Another essential factor is the natural reservoir of the virus in infected host plants from which the vector can obtain the virus to carry it to additional susceptible hosts.

The basic justification for undertaking the suppression and possible eradication of yellow leaf roll by removal of infected trees was the assumption that infected peach and nectarine trees showing symptoms constituted the principal reservoir of the virus. Early discovery and prompt removal of infected trees is important in such a program. Two factors considered essential to a further decline in the incidence of yellow leaf roll are a scarcity of the leafhopper vector, *Colladonus geminatus* (Van Duzee), in the affected area and a further diminished volume of the virus reservoir by prompt detection and destruction of infected trees.

Inspections for yellow leaf roll in 1954 started May 14 and terminated October 7. Reinspections were made periodically during the season on those properties where yellow leaf roll was found either during 1954 or previously. Approximately 102 man-months were expended on actual tree inspections, 49 of which were contributed by the State and 53 by the counties. In addition about 16 man-months were spent by the State on technical assistance, training of inspectors, clerical work, map making and administration, while about eight man-months were expended by the cooperating counties in administrative and other activities concerned with the work.

Since and including 1950, approximately 9,076,617 trees on 5,853 properties in 23 Northern and Central California counties have been inspected for yellow leaf roll. This included the entire peach and nectarine acreage north of the Tehachapi Mountains except for about 336 acres consisting of scattered plantings in 20 counties outside the main peach growing districts. Yellow leaf roll has not been found south of the Tehachapi Mountains, although repeated annual inspections of peach and nectarine acreage in Southern California have been made in connection with the peach mosaic suppression project active there since 1936.

WESTERN X-DISEASE OF PEACH

By ARCHIE SCHLOCKER, Associate Plant Pathologist

Western X-disease is considered by plant pathologists to be caused by a virus complex consisting of mild, severe and intermediate forms, and yellow leaf roll, the disease previously discussed, is believed to be one of the very virulent forms in this complex.

During 1954 all peach and nectarine trees inspected for yellow leaf roll were simultaneously examined for western X-disease. Altogether, 3,049,894 trees on 1,544 properties were inspected by state and county personnel in Butte, Contra Costa, El Dorado, Merced, Placer, Solano, Stanislaus, Sutter, Tehama and Yuba Counties with the result that 539 new tree cases were found on 226 properties distributed among all of these counties except Contra Costa and El Dorado (Table 6).

North of the Tehachapi Mountains, western X-disease is known to occur in 13 counties, namely Butte, Contra Costa, Glenn, Merced, Napa, Placer, San Joaquin,

TABLE 6

Results by Counties of Inspections for Western X-disease of Peach for 1954

County	Inspected		Infected with western X-disease				
	Properties	Trees	New properties	Total properties ¹	Properties with new tree cases	New cases (trees)	Total cases (trees) ²
Butte.....	193	304,158	16	52	33	52	127
Contra Costa.....	35	100,895	0	1	0	0	1
El Dorado.....	31	8,556	0	0	0	0	0
Merced.....	39	80,768	0	2	2	3	3
Placer.....	3	22,730	0	2	1	3	13
Solano.....	128	112,312	36	53	49	201	242
Stanislaus.....	150	310,496	8	9	9	12	12
Sutter.....	776	1,664,903	35	129	91	110	207
Tehama.....	53	72,192	16	35	35	144	147
Yuba.....	136	372,884	2	23	6	14	56
Totals ³	1,544	3,049,894	113	306	226	539	808

¹ Includes properties infected in previous years and having new tree cases in 1954.² Includes trees found in previous years and still standing at inspection time in 1954.³ Figures do not include one tree found during 1954 in Los Angeles County in the course of inspections for peach mosaic.

Solano, Stanislaus, Sutter, Tehama, Yolo and Yuba. Discovery of a western X-disease-infected tree in Southern California, at Valyermo in Antelope Valley of Los Angeles County, in the course of the 1954 inspections for peach mosaic, constituted the first report of the disease south of the Tehachapi Mountains.

Western X-disease as it occurs in California seems usually to spread more slowly in a tree and throughout an orchard than yellow leaf roll. Field studies have indicated that a significant reservoir of the western X-disease virus had developed in a number of districts of Northern and Central California prior to the beginning of intensive inspections in 1950. A high concentration of infected trees has been found during the past five years in certain localities. Appearance of the diseased trees also indicated that they had been infected for many years.

Although no uniform state-wide tree removal program has been undertaken as yet to suppress western X-disease, the infected trees in certain counties have been promptly destroyed, under the supervision of local county agricultural commissioners. In the "peach bowl," where western X-disease and yellow leaf roll often occur together in the same orchards, and where rigid suppression of the latter disease has been practiced since 1951, western X-disease-infected trees in most cases are also being promptly removed under supervision of county agricultural commissioners. For the State as a whole at least 2,808 of the 4,249 infected trees found since 1950, including the one tree in Southern California, or about 66 percent of the total, have been destroyed.

Some problems have been encountered in detection of western X-disease in peach trees growing under particular conditions. Infected trees do not always exhibit the definite diagnostic symptoms of the disease; trees may show visible injury of a kind caused by the virus but indistinguishable from that caused by other factors. Such nonspecific injury usually results in general tree decline or unthriftness accompanied by varying amounts of branch dieback. Accurate diagnosis of western X-disease based on visible symptoms alone is especially difficult in old neglected orchards where specific symptoms may be masked or entirely absent. Many trees in such orchards have severe sunburn in scaffold branches, extensive wood decay and considerable limb breakage. In these and other orchards the disease may also escape detection in trees from which infected symptomatic branches have been removed prior to inspection. Because of difficulties in detecting the disease in some trees, it has been impossible to find all actual tree cases during the first season or even after several seasonal inspections. This problem has a direct influence on the efficiency of any suppression program, since these undetected tree cases serve to maintain the virus reservoir in any given locality.

For the above reasons, definite year to year trends in the incidence of western X-disease are sometimes obscured since the discovery of new tree cases during any one season can not always be interpreted as resulting from recent natural spread of the virus.

A five-year summary of the results of inspections for western X-disease is shown by years in Table 7.

TABLE 7

Five-year Summary of Inspections for Western X-disease of Peach

Year	Inspected		Infected with western X-disease				
	Properties	Trees	New properties	Total properties ²	Properties with new tree cases	New cases (trees)	Total cases (trees) ³
1950	1,348	1,536,005	226	226	226	706	706
1951	2,104	3,391,424	238	422	276	1,352	1,851
1952	4,043	6,244,662	142	381	305	1,050	1,690
1953	1,962	3,734,228	64	326	196	601	1,675
1954	1,544	3,049,894	113	306	226	539	808
Totals ⁴	¹ (11,001)	¹ (17,956,213)	783			4,218	

¹ Figures in parentheses include duplication.

² Includes properties infected in previous years and having new tree cases in the year represented.

³ Includes trees found in previous years and still standing at inspection time in year shown.

⁴ Figures do not include one tree found during 1954 in Los Angeles County in the course of inspections for peach mosaic.

PEACH YELLOW BUD MOSAIC

By ARCHIE SCHLOCKER and R. L. McCLAIN, Associate Plant Pathologists

Yellow bud mosaic, a destructive virus disease of peach, has been found to date only in El Dorado, Nevada, Placer, Solano, Yolo and Yuba Counties in North Central California and in San Bernardino County in Southern California. It was originally found in the Winters district of Solano and Yolo Counties during 1936 and subsequently in some other parts of Solano County. Next it was found in two localities in San Bernardino County, first near Cucamonga during 1950, then in the Lytle Creek area in 1952; in the same year its widespread occurrence throughout Placer County was disclosed. Inspections during 1954 revealed for the first time its presence in El Dorado, Nevada and Yuba Counties.

During 1954 examination, by state and county personnel, of approximately 200,473¹ peach and nectarine trees on 907 properties resulted in finding 402 new tree cases on 52 properties in El Dorado, Nevada, Placer, San Bernardino, Solano and Yuba Counties, but none in Fresno or Yolo Counties (Table 8).

TABLE 8

Summary by Counties of Peach Yellow Bud Mosaic Inspections for 1954

County	Inspected		Infected with yellow bud mosaic		
	Properties	Trees	New properties	Total properties	New cases (trees)
El Dorado	31	8,556	1	1	8
Fresno	1	2,682	0	0	0
Nevada	1	30	1	1	2
Placer	115	83,288	5	43	323
San Bernardino	734	38,516	2	7	48
Solano	2	2,216	0	1	8
Yolo	8	10,726	0	0	0
Yuba	15	54,459	2	2	13
Totals	907	200,473	11	55*	402

* Includes three previously infected properties in Placer County reinspected in 1954 and on which no new tree cases were found.

Inspections for yellow bud mosaic in San Bernardino County, which included all peach trees within the area quarantined for that disease, were made in conjunction with regular annual inspections for peach mosaic. Altogether, 38,516 trees on 734 properties were examined throughout the county in the Cucamonga and Lytle Creek areas. First inspection of the season, which included all of these trees, began April

22 and ended June 9. A reinspection, June 14 and 15, was made of 2,094 trees on the seven properties where the disease was encountered during the first inspection. A total of 48 new tree cases was found, of which 45 were on five previously infected properties, and three on two new infected properties. Two of the 48 infected trees were found on two properties during the second inspection. Six of the seven infected properties represented commercial orchards, and one was a dooryard planting. All of the 48 infected trees have been removed under the supervision of the county agricultural commissioner.

Inspections in Placer County were confined mainly to nursery growing grounds and their environs. In the Bear River district they were made in conjunction with the first seasonal inspections for yellow leaf roll. Purpose of inspections was to ascertain proximity of yellow bud mosaic to susceptible hosts on the nursery premises. The inspections outside of strictly nursery environs were limited to properties with no previous history of the disease and to previously infected orchards where the diseased trees had been removed prior to inspection time in 1954. Examination of some of these previously infected orchards occasionally revealed old tree cases that apparently had been inadvertently overlooked at the time of tree removal. Among 323 new tree cases, 39 were on five properties not previously known to be infected. No yellow bud mosaic was found on nursery properties or in their immediate environs; however, the widespread occurrence of the disease throughout Placer County makes it advisable that nurserymen secure more isolation for their propagating grounds from commercial and dooryard plantings of known virus hosts.

Inspections in Yuba County included peach and nectarine plantings on the Bear River and Wheatland district, adjacent to an infected area in Placer County; involved were approximately 54,459 trees on 15 properties, representing about 15 percent of the total estimated peach and nectarine acreage in the county. These inspections revealed 13 infected trees on two properties. One of the infected trees was found in a planting which lies on both sides of the Placer-Yuba county line near the Bear River, just south of Wheatland. Yellow bud mosaic had been found in the Placer County portion of this orchard prior to 1954. The other 12 infected trees were in a localized spot in an orchard located approximately one and one-half miles west of the location where the single infected tree had been found. These were old trees showing evidence of having been infected with the virus for a number of years prior to 1954. They had previously escaped detection, presumably because inspections had not been made early enough in the season to coincide with adequate symptom expression in the diseased trees. The entire block containing the 12 infected trees has been removed, and the single infected tree on the other property has also been destroyed.

The entire commercial peach and nectarine acreage of El Dorado County was inspected for yellow bud mosaic during 1954. Altogether, approximately 8,556 trees were examined on 31 properties with the result that eight tree cases were found in a localized portion of a small orchard located approximately four and one-half miles east of Placerville. The infected trees ranged in age from young seedlings to mature bearing trees, several of which were at least 80 years old and others 40 years of age, according to the grower. Interspersed among these eight trees were others whose general appearance suggested infection by the virus but which lacked corroborative symptoms necessary for confirmation of the disease. These suspects and possibly other unthrifty trees in this planting may show definitive signs of yellow bud mosaic in subsequent years. The disease incidence, the pattern of its occurrence in the orchard and the characteristic tree damage indicated a relatively long period of infection. Efforts to trace the original introduction of the virus into the planting gave negative results. The commissioner has reported that the eight infected trees were removed.

As in previous years inspections for yellow bud mosaic were made of one experimental planting in Fresno County and two in Solano County. They resulted in finding eight infected trees in one previously infected experimental planting in Solano County.

The discovery in June, 1954, of two yellow bud mosaic-infected peach trees on a property near Chicago Park, Nevada County, added that county to the infected list. These two trees were found by bureau personnel inspecting budwood source trees under the virus-free nursery stock project. The commissioner has reported them removed.

Inspections for yellow bud mosaic in Yolo County were limited to those peach plantings lying outside of the yellow bud mosaic quarantine lines, to ascertain the

presence or absence of the disease in that portion of the county. No yellow bud mosaic was found.

In addition to the peach acreage inspected in the yellow bud mosaic quarantined area of San Bernardino County, other peach plantings were examined in the course of inspections for peach mosaic in Los Angeles, Orange, Riverside, San Bernardino and San Diego Counties by inspectors instructed in the symptoms of yellow bud mosaic and requested to be on the alert for it.

VIRUS-FREE NURSERY STOCK

By H. KEITH WAGNON, *Associate Plant Pathologist*

The work of this program is concerned with the problem of developing methods of certification to buyers that fruit, nut tree and vine nursery stocks offered for sale are free of serious virus diseases, thereby improving the consumer acceptance and marketability of such stock.* Its solution calls not only for the development of suitable and practical methods for detecting, recognizing, identifying and avoiding the virus diseases which can affect nursery stock but also for the integration of such methods into nursery practice.

This work is predicated on the fact that numerous viruses are now known to affect the deciduous fruits, nut trees and grapevines and that many of these viruses have become widely distributed in nursery stocks by the use of infected propagation sources. Once distributed by man, further spread of the viruses has taken place as the result of insect vectors. Work to date has shown that a number of stone fruit varieties are apparently universally contaminated with virus diseases. In order to prevent the contamination of other varieties already in commercial use as well as those being developed for the future, immediate steps are needed to assure virus-free sources of these stocks. It is therefore a problem in which the plant breeder is as vitally concerned as the propagator.

Some special budwood sources are being established, but nurserymen continue dependent upon commercial orchard and vineyard plantings as sources of supply when large quantities of propagating materials are needed. A few also gather limited quantities of budwood from growing stock in the nursery rows. The use of nursery row stock for propagating sources is an expedient practice, but it is hazardous when freedom of the stock from viruses has not been established.

Much of the work of this project has been concerned with field examination of budwood source trees and vines designated by nurserymen. The inspection procedures involve critical visual examination of each tree and vine after foliage development in the spring. Each plant regarded as unfit for use as a propagating source is marked with paint in a conspicuous place on the trunk so the nurseryman may recognize and avoid it. Source plantings which have serious diseases or show a relatively high incidence of one or more of the minor virus diseases are rejected, and the nurseryman is requested to submit additional sources for inspection. When unrecognized symptoms are found and there are reasons to suspect virus infection, inoculation tests are made in a test plot maintained for that purpose.

Tangible results of the work, although difficult to estimate at this time in dollars and cents, begin to reflect in the improved quality of nursery stock offered for sale. Some nurserymen have been able to obtain premium prices, especially for cherry nursery stock, when it can be shown to be virus-free. As the work progresses more results of this type may be expected. Work started on cherries four years ago now begins to show results. Later the benefits should become evident in other kinds of stock.

Group meetings with cooperating nurserymen and breeders, both in conference and in the field, were held in March and May. Topics of discussion consisted of the general nature of viruses, their recognition, means of dissemination, suppression and their occurrence in California. By means of a field trip to the test plots maintained by this bureau and the University of California Agricultural Experiment Station, propagators and breeders were able to see various stone fruit and grape varieties which had been inoculated with virus diseases like those encountered during the routine budwood source inspections.

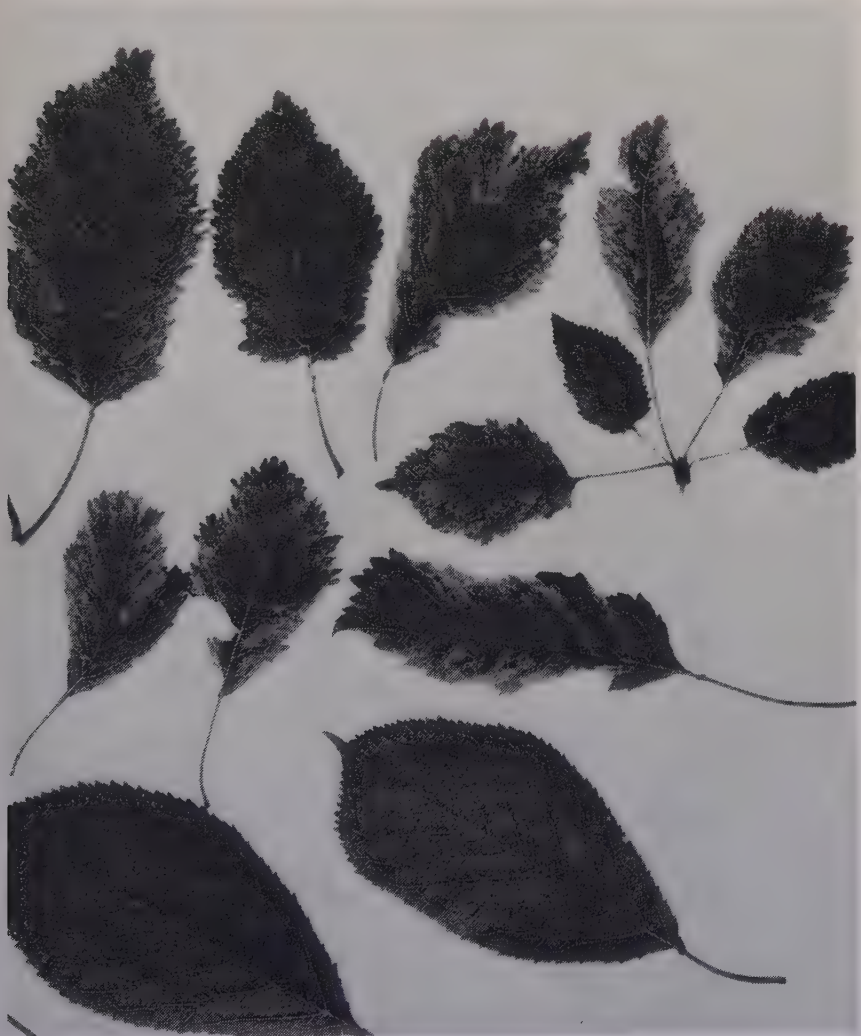
This program has been conducted by close cooperation with members of the United States Department of Agriculture, the University of California Agricultural Experiment Station, the county agricultural commissioners, Nursery Service of the

* For this project state funds were matched with federal funds received from the Agricultural Marketing Service, United States Department of Agriculture, under provisions of the Agricultural Marketing Act of 1946.

California Department of Agriculture, nurserymen, growers, horticulturists and fruit tree breeders.

Commodities worked on during 1954 included cherries, peaches, nectarines, almonds, apricots, plums, prunes and grapes. Approximately 82 nurserymen in California were involved in the production of the stone fruits; those producing the greatest volume of these stocks are participating in the program of this project. Some of these nurserymen, plus others not growing stone fruits, participated in the program for grapes. During the year the work was carried on throughout the State in 23 counties, but was conducted largely in the Sacramento and San Joaquin Valleys where greatest volume of commodities concerned are grown.

CHERRIES. Virus-free cherry scion and budwood sources continue to be limited. Current sources consist of small plantings owned by individual nurserymen and commercial plantings of several growers. The University of California Agricultural Experiment Station also has provided nurserymen with limited quantities



Leaves affected by cherry crinkle compared with two normal leaves. Note the malformation and chlorotic markings of the affected leaves.

of budwood. These available sources have included Bing, Black Tartarian, Burbank, Deacon, Lambert, Black Republican, Royal Anne and Van varieties. Growers now recognize, more than heretofore, the need for planting virus-free cherry stock. Nurserymen are aware of this demand and have made greater efforts to obtain virus-free budwood.

The occurrence of ring spot and cherry rugose mosaic diseases in young commercial plantings consisting of trees grown from sources regarded as virus-free emphasizes the need for budwood sources being completely isolated from commercial plantings of stone fruits.

Tree-by-tree examinations were made of 5,197 cherry trees on 14 properties; 495 trees were found unfit for propagating use.

PEACHES AND NECTARINES. Considerable emphasis was again placed upon the examination of peach and nectarine sources. There has been increased production of some kinds of these nursery stocks as the result of interest in the numerous recently introduced shipping varieties. It is of prime importance that these new varieties be kept free of virus infection during their introductory period, since nearly every available tree during this period serves as a budwood source.

Inspections during the year included 44,419 tree examinations on 150 properties; 2,621 trees were found to be unfit for propagating use.

Nurserymen within the yellow bud mosaic quarantined area of Placer County, who must go outside of the area for their budwood, requested inspection of scion and budwood sources located outside of quarantine areas. Inspections of two of these sources revealed yellow bud mosaic. One of the properties was near Colfax in Placer County and one was near Chicago Park in Nevada County. The disease was also encountered in a variety trial block within the quarantined area of Solano County on a property which had a history of previous infection.

The reduction of the incidence of yellow leaf roll disease in the "peach bowl" area of the Sacramento Valley has in some degree eased but not climinated the threat of this disease to budwood sources and nursery growing grounds. Quarantine regulations restrict movement of propagating materials within and from this area but propagation of the known susceptible host plants within the area is permissible under certain conditions.

A disease, exhibiting leaf symptoms suggestive of yellow leaf roll and to a lesser degree western X-disease, has been observed since 1952. During 1954 the disorder was noted on 212 trees involving nineteen peach and nectarine varieties distributed on 20 separate properties in seven counties. Preliminary tests have shown the condition to be graft transmissible. All known affected trees have been rejected as budwood sources. Several different symptom expressions observed during the growing season have suggested the working names "false yellow leaf roll," "terminal stunt" and "terminal dwarf." The selection of a definite name for this disease must await further work on its identity and possible relationships to other virus diseases.

Other diseases encountered in peach and nectarine source properties included the rather confusing virus disorder tentatively known as "peach stunt" which was found in 49 trees on nine properties. This disorder also was encountered in a high percentage of fall-budded yearling trees of one variety in a single nursery where the budwood had been collected from nursery stock produced the previous year. The infected nursery stock was destroyed. This situation emphasizes the hazards of taking budwood from nursery row trees for which a virus-free history has not been established. Thirteen tree cases of western X-disease were found on five properties distributed in three counties. Sixty-six tree cases of peach calico were found on four properties in three counties. Sixty-one of these cases occurred in a variety trial block of a breeder where an old commercial planting of Golden Jubilee peach trees had been used as understocks for the varieties undergoing field tests. This situation emphasizes the importance of making sure that understocks are virus-free before placing valuable varieties on them.

GRAPES. Preliminary work on grapes was initiated during the year. Several nurseries submitted propagating sources located in commercial plantings, and exploratory inspections were made. Limited quantities of growing nursery stocks were also examined.

Several virus diseases have been recognized in commercial grape plantings in California. Nurserymen collect the majority of their grape cuttingwood material from pruning wood in the vineyard. This is a hazardous method for canes from both diseased and healthy vines may become mixed during the pruning process. Cuttingwood of off-variety vines may also be collected unintentionally in this manner.

Inspections of propagating sources included 166,348 vines on 38 properties. Among them were 1,192 vines infected with such diseases as fanleaf, yellow mosaic and Pierce's disease.

ALMONDS. Inspections of almond budwood sources have continued along the same lines as preceding years. Diseases encountered included almond calico, ring spot and Drake almond budfailure. An undescribed disorder, possibly resulting from virus infection, was found on four trees of the Jordanelo variety on one property. This condition was characterized by chlorotic and malformed leaves.

Tree inspections of budwood sources included 10,376 trees on 36 properties in which 101 trees were found to be unfit for scion and budwood use.

PLUMS AND PRUNES. Examination of plums and prunes was continued on a somewhat larger scale to include more varieties. Inspections included 8,014 tree examinations on 46 properties where 630 trees were found unfit for propagating use.

Line pattern was the most prevalent virus disease found in plums. The high incidence of this mild virus is believed to be attributable to the contamination of cutting-grown rootstocks.

Prune diamond canker, a virus disease presently known to occur only on the French (Agen) prune variety, was found on 70 trees on six properties in two counties.

During 1953 and in 1954, mild leaf symptoms characterized by chlorotic, feather-edged blotches or clearings between or along the veins and veinlets were found on a total of 15 Wickson plum trees on one property. Using buds taken from one of the affected trees, inoculation tests made in 1953 resulted in the production of somewhat similar but more striking leaf symptoms on two Burmosa plum trees during the 1954 growing season. Further investigations are in progress to determine other susceptible hosts of this disorder which appears to be caused by a virus new for plum.

A leaf spotting disorder of Jefferson plum tentatively regarded as being the same as Italian prune leaf spot was found in most commercial plantings designated as budwood sources. The seriousness of the disorder seems to vary from year to year, depending upon environmental factors. In one nursery, approximately 80 percent of the fall-budded stock of this variety failed to attain salable size when affected budwood had been used.

Tragedy canker or pustular canker, a disease of Tragedy plum which was reported by R. E. Smith in 1941, was found present in such a high number of trees that it is questionable whether any trees of the variety are free of it. This disease under some conditions may cause reduced yields in orchard trees and on several occasions it has been responsible for some losses in the production of yearling Tragedy trees in the nursery. The cause of this disease is unknown but may be a virus.

APRICOTS. The number of apricot budwood sources submitted by cooperating nurserymen this year was considerably below the number anticipated. This resulted in part from the fact that the majority of California's apricots are grown by a limited number of nurseries and also because a number of the nurseries collected budwood from growing nursery stock still in the nursery row. Examinations of scion and budwood sources involved 3,624 tree inspections on 10 properties; nine mature trees were found unfit for propagating use.

Line pattern was found to be the commonest virus disease present in apricots, and except for one source tree in a commercial planting, all infections found were confined to yearling nursery stock growing in the nursery. The major portion of these affected yearling trees was on cutting-grown plum rootstocks and their distribution in the nursery row indicated that the rootstocks were probably the source of infection. However, the collection of budwood from infected growing nursery stock appears to be a contributing factor.

GRAPE VIRUS DISEASE SURVEY

By T. R. CARPENTER, *Associate Plant Pathologist*

A survey was made during 1954, with federal, state and county funds under the direction of this bureau in cooperation with the county agricultural commissioners for the purpose of evaluating fanleaf of grape, a virus disease, including its distribution, its seriousness, its apparent rate and method of spread in the vineyards and the possible means of control. Although fanleaf was the principal disease considered in the survey, data was accumulated concurrently concerning some other virus dis-

eases. Descriptions of the diseases can be found in "Some Virus and Virus-like Diseases of Grapevines" by William B. Hewitt, published in *The Bulletin* of the California Department of Agriculture, April-May-June, 1954.

The inspection of vines began in April and terminated in October. Inspections were conducted in 42 grape-producing counties from San Diego County in the south to Shasta in the north on 1,069 properties involving 2,591 plantings and 133 varieties. There were 1,761,464 grapevines actually inspected or approximately 0.84 percent of all grapevines in the State.

An estimated total of 64 man-months was required to make the survey. This included 52 man-months for actual vineyard inspection by state and county personnel and 12 man-months for administration, technical and clerical (state and county) help, and other activities pertaining to the survey.

FANLEAF. On most varieties, fanleaf is characterized by early season dwarfing, shoot and leaf deformity, light mottling of young leaves, flower cluster shelling, and apparent recovery of vine growth beginning about midseason. This disease does not usually kill vines, but it progressively reduces production and vigor of vines following appearance of the first symptoms. The disease was detected in 27 of the 42 counties, on 177 of the 1,069 properties, and in 4,515 vines of 72 varieties in 250 plantings. The counties in which fanleaf was found, their total estimated * grape acreage, properties inspected and infection found are shown in Table 9. Table 10 shows the counties and properties where fanleaf was not detected.

TABLE 9
Counties and Properties Where Fanleaf Was Found

County	Estimated total acreage	Properties		County	Estimated total acreage	Properties	
		Inspected	Fanleaf found			Inspected	Fanleaf found
Alameda.....	3,027	12	7	Riverside.....	12,700	25	14
Amador.....	711	5	1	San Benito.....	1,186	12	1
Contra Costa.....	3,513	23	1	San Bernardino.....	29,653	19	8
El Dorado.....	79	10	1	San Joaquin.....	55,284	90	4
Fresno.....	162,787	260	22	San Luis Obispo.....	707	9	5
Kern.....	26,647	29	17	Santa Clara.....	5,150	20	10
Kings.....	5,230	24	3	Santa Cruz.....	572	8	1
Los Angeles.....	1,307	19	4	Shasta.....	36	5	1
Madera.....	18,009	51	10	Solano.....	690	6	3
Mendocino.....	6,722	36	2	Sonoma.....	11,866	53	7
Merced.....	15,274	35	10	Stanislaus.....	16,273	62	10
Napa.....	10,625	26	8	Tulare.....	66,002	85	23
Nevada.....	73	4	2	Ventura.....	191	5	1
Placer.....	1,111	11	1				

TABLE 10
Counties and Properties Where Fanleaf Was Not Detected

County	Estimated total acreage	Properties inspected	County	Estimated total acreage	Properties inspected
Butte.....	120	9	Orange.....	44	12
Calaveras.....	217	8	Sacramento.....	2,037	20
Colusa.....	122	3	San Diego.....	3,726	16
Glenn.....	81	9	Sutter.....	90	4
Imperial.....	1,220	6	Tehama.....	85	6
Lake.....	159	12	Yolo.....	311	10
Marin.....	178	4	Yuba.....	42	2
Monterey.....	119	4			

The results of the survey as shown in the above figures, based on small samples of the vineyards and grapevines in the State, indicate by statistical analyses that the actual percent of grapevines infected in the State is between 0.25 and 0.3; that

* From estimates for 1953 by California Federal-State Crop Reporting Service.

the actual percent of properties on which infection occurs is between 13 and 21; and the actual percent of plantings on which infection occurs is between 7.3 and 12.

Observations made during the inspections indicated that fanleaf can seriously reduce production and growth of individual infected vines of susceptible varieties, and that certain varieties are more resistant to the disease than others. In fact, abnormalities of vine growth and reduction of berries in the cluster resulting from flower shelling caused by the disease commonly were major criteria by which infected vines were detected and infection diagnosed. The disease does not appear to spread rapidly in nature but rather is readily spread and perpetuated through infected propagating material.

The inspections indicated that fanleaf is too widely distributed in the State for eradication to be practical, and that quarantine regulations do not seem to be applicable. Apparently, some method of preventing the disease in future plantings is the better approach to controlling it. Work on a separate project in which special care is exercised in the selection of virus-free grape propagating material for nursery stock intended for new plantings is now under way.

YELLOW MOSAIC. This disease, formerly called grapevine mosaic, may be recognized in early spring growth by a yellowing of leaves, stems and in some instances flower clusters. The degree of yellowing may vary with the season, variety and strain of the virus which causes the disease. Other symptoms of yellow mosaic include many kinds and degrees of leaf mottling and blossom shelling. The disease was found in 19 of the 42 counties, on 134 of the 2,591 plantings, and in 2,788 vines of 44 varieties.

Observations made during the survey indicate that yellow mosaic is comparable to fanleaf in reducing the production of infected grapevines.

The inspections show that the disease is widespread in the State. The suggested approach toward controlling fanleaf is applicable to yellow mosaic.

YELLOW VEIN. This disease, previously referred to by the term "unfruitful vines" under the topic "viruslike diseases" in the publication previously mentioned, has now been named yellow vein and has been found to be transmissible according to a communication from W. B. Hewitt. It is characterized by straggly bunches with shot berries or by no fruit, and by mottling, speckling and vein yellowing on leaves formed principally at about the 10 basal nodes. Yellow vein was found in 16 of the 42 counties, on 178 of the 2,591 plantings, and in 8,152 vines of 47 varieties. More grapevines were found infected with yellow vein than with fanleaf and yellow mosaic.

This disease was observed to interfere seriously with the production of grapes on infected vines.

Yellow vein was shown by the inspection records to be widely distributed in the State, and like yellow mosaic, the suggested approach toward controlling fanleaf is applicable to this disease.

WHITE EMPEROR DISEASE. Emperor grapes remain white or nearly white and contain less than normal sugar content at maturity on vines infected with white emperor disease. This disease was found in 20 of 25 inspected plantings distributed in Fresno, Merced and Tulare Counties. There were 30,002 vines inspected of which 2,263 were infected.

Since this disease is not known to spread naturally in the vineyards or to be soil-transmitted, it would seem that control could be obtained by replacing infected with healthy vines. In producing grape nursery stock or otherwise propagating grapevines it is highly important that cuttings or budwood be used only from healthy or non-infected vines.

SCLEROTIIUM ROLFSII ON GLADIOLUS

By T. R. CARPENTER, Associate Plant Pathologist

Southern blight, a disease caused by the fungus *Sclerotium rolfii* Sacc., was found in a commercial planting of gladiolus during 1953. A hold order was placed on the corms harvested from this planting by the local county agricultural commissioner to prevent distribution of the disease pending an effective treatment of the corms.

In the bureau laboratory, it was determined that the fungus did not penetrate or actually infect the corm tissue but that mycelium and sclerotia of the fungus may grow on and adhere to the surface of the corm and its tunic.

The use of "Sperguson" as a fungicide was a regular practice by the grower. Our laboratory tests demonstrated that sclerotia of the fungus were not inactivated after being dipped in "Sperguson" at the concentration of one pound in 60 gallons of water.

Methyl bromide gas had been suggested as a fungicidal treatment. Tests made in cooperation with the Bureau of Entomology revealed that more than 15 pounds of methyl bromide gas per 1,000 cubic feet at 80 degrees F. for four hours at relative humidity of approximately 60 percent were necessary to inactivate wet sclerotia of the fungus, and that dry dormant gladiolus corms could not tolerate as much as 10 pounds of the gas under the same conditions of temperature, time and relative humidity.

Tests in our laboratory indicated complete inactivation of free sclerotia by soaking them for 30 minutes in a 1:1,000 water solution of bichloride of mercury with barely sufficient wetting agent added to cause the solution to feel slippery between the fingers. It was concluded that this treatment should be used for the infested corms. They therefore were given this treatment by the grower under the immediate supervision of the local commissioner and the general supervision of this bureau. A substantial portion of the treated corms was retained by the grower and planted for reproduction in fields not known to contain *S. rolfsii*. Inspections of these plantings after the plants were mature did not reveal the presence of southern blight. A delay of 10 days in flowering in the plants grown from the treated corms, compared to others from untreated corms, was reported by the grower.

PLANT PARASITIC NEMATODES

By W. H. HART, Associate Plant Pathologist (Nematology)

A strong interest continued during 1954 in the diseases caused by plant parasitic nematodes. Nematode surveys were made in cooperation with Nursery Service and the county agricultural commissioners. Specimens received from all sources included samples of roots, stems, leaves and seeds as well as numerous soil samples.

Soil examinations frequently are necessary to demonstrate the presence of normally endoparasitic nematodes which may have migrated from rotting roots and to investigate the possibility of ectoparasitic species. Prospective planting areas are also commonly surveyed by means of soil samples. Soil is washed through screens of increasing fineness thus separating out nematodes from mineral matter and detritus. Plant parasitic species are then separated from other forms by examination of the screenings under the microscope.

Plant and soil samples examined for nematodes in 1954 totaled 1,579. Root-knot nematodes, *Meloidogyne* spp., were found in 212 specimens including tomato, strawberry, deciduous fruits and nuts and ornamentals. Root-lesion nematodes, *Pratylenchus* spp., were found in 128 specimens; 53 additional soil samples contained root-lesion nematode species not known to cause plant injury.

Other common nematodes found in specimen material included *Ditylenchus dipsaci* in alfalfa, narcissus and garlic and *Heterodera* spp. in cabbage, brussels sprouts and mustard. A number of other plant-parasitic nematodes was found during the year in association with plant roots but without definite evidence of plant injury.

On January 11, 1954, the spring dwarf nematode, *Aphelenchoides fragariae* (Ritzema Bos, 1891) Christie, 1932, was identified in Lassen strawberry plants originating in Central California. This nematode was not known to be currently present in strawberry nurseries or in commercial strawberry plantings in California although it was known to have been introduced in strawberry nursery stock on a previous occasion.

A survey of strawberry plant nurseries and of commercial strawberry plantings to determine the distribution of the spring dwarf nematode in the State was conducted during the spring and summer of 1954. This nematode was found on 40 properties in six counties. A total of 1,972 acres was inspected in 21 counties. Infestations were traceable to a few infested commercial berry fields in Central California from which runner plants had been taken. Apparently this nematode has caused little injury in the hot dry interior areas of Central California and can be easily overlooked in this area unless very close inspections are made in the early spring.

A survey of strawberry plant nurseries for the root-lesion nematode, *Pratylenchus penetrans* (Cobb, 1917) Filipjev and Stekhoven, 1941, thus far indicates that this nematode is of limited distribution in such plantings.

The burrowing nematode, *Radopholus similis* (Cobb, 1893) Thorne, 1949, is recorded as the causal organism of spreading decline, a serious disease of citrus in Florida. The finding of this nematode by S. A. Sher of the Department of Nematology, University of California at Riverside, in a potted ornamental banana plant imported from the Hawaiian Islands was reported to us on September 21, 1954. A survey to investigate the extent of infestation of imported nursery stock and to determine whether the nematode was present on established plants in the State was initiated. A list was compiled of known host plants as well as common sources of these plants and many root and soil samples were taken for laboratory examination.

This survey is still in progress but interesting results are already apparent. The nematode has not been found in the State on established ornamentals planted from imported stock. Records of the California Department of Agriculture and of the University of California have not shown it to be present here on citrus.

Imported ornamental planting stock, principally banana and anthurium, have been shown to frequently contain the nematode.

LABORATORY DIAGNOSIS

By C. G. WEIGLE and ALEX M. FRENCH, Associate Plant Pathologists

The diagnostic laboratories operated by the bureau in Sacramento and Riverside function chiefly to examine and determine or confirm the cause of disease in specimens received, mostly from county agricultural commissioners and their staffs, but also from departmental personnel, other agencies and growers. Some of the material is submitted by members of the bureau.

Quarantine measures and control recommendations or eradication programs sometimes are based on the results of laboratory findings. New or unusual diseases occasionally are found. A new finding may be a disease not found or reported previously in the State, or it may be a case where the pathogen is known to be present but found attacking a previously unreported host.

Among the more interesting or unusual plant diseases diagnosed during the year were several mentioned below.

Colletotrichum phragmitidis P. Henn., which causes stem canker of bamboo (*Bambusa* sp.) was intercepted in a shipment from another state. This fungus is not generally established in California.

Two ornamental plants (*Betula striata* Reland, f.) shipped from another state were infected with a rust which was identified by George B. Cummins of Purdue University as possibly *Uromyces betulae* Cummins. This is our first record of this fungus.

Rust (*Puccinia carthageni* Co.) caused a severe leaf and stem infection of a large planting of safflower (*Carthamus tinctorius* L.). Most of the damage resulted from a stem infection at the soil level which weakened the stems so that many plants were broken off by the wind.

There occurred several very severe infections of Merion bluegrass (*Poa pratensis* L.) with a rust identified by Cummins as an undetermined race of *Puccinia graminis* Pers. which is now known to occur from coast to coast.

Several tree peony plants (*Paeonia moutanensis* And.) in a nursery growing ground were infected with *Rosellinia* (*Hematiophora*) *secotria* (Hart.) Berl. These plants had been used as a scion source. The infected and surrounding plants were destroyed and the site taken out of use as a growing ground for any plants.

Sclerotium rolfsii Sacc., a well-known pathogen of sugar beets, dicotyleds, and many other plants, was found killing out an extensive courtyard planting of periwinkle (*Viola minor* L.). This is the first known record of the fungus on that host.

Several commonly occurring fungi were found attacking plants which, according to our records, had not previously been recorded as hosts. These include *Verticillium albo-atrum* Reink. & Berth. on Chinese elm (*Ulmus parvifolia* Jacq.) and on Chinese pistachio (*Pistacia chinensis* Bunge); *Sclerotinia sclerotiorum* (Lib.) DBy. on dicotyleds (*Dichondra repens* Forst.) and perennials (*Geranium* sp.); *Septoria* sp. leaf spots on leopard plant (*Ligularia huampferi* Sieb. & Zucc. var. *aureo-maculata* Hook.); *Cephusporium* sp. causing wilt of canopy trees (*Crotalaria agatiflora* Schweinf.).

A commercial planting of sweet potato (*Ipomoea batatas* (L.) Lam.) was heavily infected with soil rot caused by *Streptomyces ipomoeae* (Person & W. L. Martin) Wasm. & Henrich. This disease is generally distributed in California but has seldom been called to our attention.

Pseudomonas syringae Van Hall, a commonly occurring bacterium with a wide host range, caused a severe twig blight of evergreen euonymus (*Euonymus japonicum* L.) and weeping willow (*Salix babylonica* L.). The organism was identified by Peter A. Ark, University of California.

Nursery tulip trees (*Liriodendron tulipifera* L.) showing severe root injury were infected by root-lesion nematode identified by S. A. Sher, University of California, as *Pratylenchus* sp. Such a situation had not previously been reported.

Of 3,859 specimens received for examination, 3,589 were submitted to the Sacramento Laboratory and 270 to the Riverside Laboratory. The 3,589 included 365 from the state border quarantine stations. Below is a classification of the specimens on the basis of the type of host plant and the causal factor involved. In some instances a specimen was affected with more than one causal factor.

<i>Crop category</i>	<i>Number of specimens</i>
Tree fruits, nuts, and grapes	923
Vegetables	377
Flowers	609
Ornamental shrubs and vines	319
Small fruits	953
Forest and shade trees	243
Cereal, forage, and field crops	86
Soils	215
Miscellaneous (turf, weeds, etc.)	134
Total	3,859
<i>Causal factor</i>	<i>Number of instances</i>
Fungi	845
Bacteria	118
Viruses	121
Nematodes	673
Parasitic flowering plants	2
Disease or condition not caused by organisms	885
Referred to other bureaus or agencies (insects, chemicals, etc.)	99
Disease-free or negative for specified examination	1,149
Undetermined	89
Total	3,981

BUREAU OF RODENT AND WEED CONTROL AND SEED INSPECTION

WALTER S. BALL, *Chief*

The functions of the bureau continued to expand during 1954. Weed control continued on a moderate upturn, including the earmarking and undertaking of numerous and important projects, many of which were in the formative stage until 1954. New developments in chemical weed control continued to be made, as in the past 10 years, with new chemicals and new formulations and combinations of older chemicals coming to the attention of our weed control staff. The development of specific chemicals for specific uses became more apparent. Advances were likewise made in the field of weed spraying equipment with the development of the jet nozzle for fixed-wing aircraft. Ground spraying equipment was also improved by the adoption of principles and design created to reduce spray drift. This latter development had a great deal to do with the improvement in the 2,4-D drift situation throughout the State. The year passed without a single spray drift case sufficiently serious to warrant a departmental hearing. Halogeton and camelthorn were given special attention as state weed projects; a great deal of time also was spent in an attempt to find an economical and practical method for the control of Russian knapweed and leafy spurge.

The field situation in rodent control continued to change. There has been a progressive re-evaluation of areas where field rodents are known to harbor diseases transmissible to humans. This re-evaluation, conducted by continued survey by the State Department of Public Health, this bureau and county agricultural commissioners, is dependent upon the rodent population in relation to or in close proximity to areas of dense human population. One of the most recent outbreaks of bubonic plague was reported from the Colma and Daly City area of San Mateo County. This outbreak involved the smaller field rodents such as *Peromyscus*, house mice, field mice and domestic rats. The new rodenticides, Warfarin and Pival, have continued to be effective and safe to use for the control of small rodents in residential and recreational areas. The reduction in the size of plague areas has resulted in over one million acres being added to the areas where economic rodent control is being carried on for the control of ground squirrels. The bureau has continued to take an active part in assisting county agricultural commissioners. Bureau personnel have also given technical advice in rodent control campaigns carried on in military reservations. In view of the continued reduction in numbers of ground squirrels, it appears the gopher is rapidly becoming the most important rodent pest insofar as agricultural losses are concerned.

During the past year the rabbit situation continued to be serious. In the Blythe area and the desert region of the lower San Joaquin Valley, heavy losses were experienced in cotton, alfalfa and other crops adjacent to sagebrush and range lands.

Since surveys of the muskrat problem are still in progress, study of methods for control will be continued. Bait boxes and bait materials were used experimentally during the year with some rather satisfactory results.

Control of predatory animals, for the protection of livestock, poultry and certain crops, valuable game species and for the suppression of rabies, continued to be conducted under the joint program of the California Department of Agriculture, the United States Fish and Wildlife Service and 35 cooperating counties and the Tehama Predator Association. Numerous cases of rabies were reported throughout the State; one fatal human case occurred in Tulare County. Stockmen generally reported losses throughout the State at a low level, and in some sections the complete absence of losses was noted. The number of predators taken during 1954 was 9,850, compared with 10,056 in 1953. Fewer losses reported during the year indicated a continuous reduction in numbers of predatory animals. It seems quite apparent, therefore, that the continued taking of predators is constantly reducing livestock losses.

Seed production continued to expand, which resulted in greater demands on the bureau with regard to enforcement of the California Seed Law and seed screenings regulations. During the peak season the laboratory operated at full capacity. Due to increased capacity of the laboratory and better trained personnel, the work load continued to be handled more efficiently than during 1953. The seed certification

program has continued to expand, with alfalfa showing the greatest increase—a yield of some 40 million pounds. A seed analyst, grade I, was employed to assist in the quarantine work of the Los Angeles laboratory. This laboratory handles all quarantine samples for the 10 southern counties, to determine the presence of noxious weed seed.

WEED CONTROL

MURRAY R. PRYOR, *Field Supervisor of Weed Control*

Weed control activities in California for 1954, compared with 1953, took a moderate upturn. The year marked the undertaking of numerous and important projects, many of which until recently were in the formative stage.

The great evolution in the field of chemical weed control, witnessed during the past 10 years, continued undiminished. The development of specific chemicals for specific uses became more apparent as the search for more effective herbicides progressed. Research and field experience with present materials also brought about greater benefits through their more intelligent use.

Advances were also made in the field of weed spraying equipment, for example the development of the jet nozzle for fixed wing aircraft application of hormone-type herbicides. Ground spraying equipment was improved by adopting principle and design from the field of horticulture to reduce spray drift, for example, the use of hooded booms and low pressure jet-type spray wands.

Of historical note was the great improvement in the 2,4-D drift situation throughout the State. The year closed without a single spray drift case sufficiently serious to warrant a departmental hearing. This development may be attributed to the formulation of better regulations governing the use of 2,4-D and other injurious herbicides, the advent of the jet-type nozzle with its attendant capacity of larger droplet size pattern for airplane spraying, closer supervision in the counties and greater awareness on the part of commercial pest control operators and farmers alike concerning their legal and financial responsibilities in using injurious herbicides.

Worthy of report and of historical record was the service agreement entered into by the Orange County Flood Control District and the local county department of agriculture. By the service agreement arrangement the Orange County Department of Agriculture, upon request of the flood control district, contracted for the control of cattail, tule and other weeds in the channels of the district. During the year 10 miles of water channels were treated at a cost of \$2,200, resulting in excellent control of the water weeds. As far as known this was the first incidence of a county department of agriculture entering into such an agreement with a flood control district.

From the standpoint of bureau activity it was a busy year. Bureau representatives devoted much time to county-state and other projects. In addition many calls were made in response to agricultural commissioners' requests for assistance with weed problems and weed control recommendations. Test plot work by bureau representatives was the basis for recommendations for several important weed projects. One of the most notable was the Afton Canyon camelthorn project in San Bernardino County. Increased time was devoted to weed surveys, particularly the camelthorn and halogeton projects, in which the department is directly interested. Limited time was spent in organizing a Johnson grass survey for the agricultural commissioner of Yolo County, and assisting the Soil Conservation District of Susanville with a chicory survey. The purpose of these surveys was to accumulate accurate acreage data so that project cost estimates might be made.

Newly Registered Herbicides

Dalapon (2,2 Dichloropropionic acid, sodium salt 78 percent), a new plant growth regulator effective on grasses, including such perennials as Bermuda grass (*Cynodon dactylon*), Johnson grass (*Sorghum halepense*), and Quackgrass (*Agropyron repens*), was registered during the year by the Dow Chemical Company with the Bureau of Chemistry.

Kuron, known chemically as 2-(2,4,5-Trichlorophenoxy) propionic acid, also by the nickname "Silvex," was another product registered by the Dow Chemical Company. Silvex, a growth regulator relatively toxic to broad-leaved plants, is supposedly less toxic than 2,4-D to certain crops like cotton.

Compound N-869, containing N-methyl dithiocarbamate dehydrate, was registered by the Stauffer Chemical Company as an experimental soil fumigant.

Chlorea, a soil sterilant, registered by the Chipman Chemical Company, is a mixture composed of sodium chlorate, sodium metaborate and CMU.

The following soil sterilant mixtures were registered by the Pacific Coast Borax Company: (1) DB-Granular containing disodium tetraborate pentahydrate, disodium tetraborate decahydrate and 2,4-D; (2) DB Spray Powder containing disodium octaborate tetrahydrate and 2,4-D; and PCB S-5 containing disodium tetraborate pentahydrate, disodium tetraborate decahydrate and CMU.

Sta-Klor, a soil sterilant composed of sodium chlorate, sodium trichloracetate and pentaborate decahydrate, not previously reported, was registered by the General Chemical Division, Allied Chemical and Dye Corporation, in 1953.

New formulations of 2,4-D and 2,4,5-T including new heavy esters (low volatile) were registered during the year. Greater interest in MCP (2-methyl-4-chlorophenoxyacetic acid) was reflected by increased registration. Eight companies registered this material for sale in California.

Other Herbicides

Significant trends in the use of hormone-type herbicides pertain to formulation rather than volume, although demand for these materials increased. Greater demand for the low volatile esters of 2,4-D, to an increasing extent, among other things, was due to their use for the control of woody plants. Increased demand for the emulsive acid formulation was evinced in its greater use for control of herbaceous perennials. On the downward trend were the amine salt formulations, which gave ground to MCP in rice weed control.

Increased demand for 2,4,5-T and brush killers (2,4,5-T plus 2,4-D) was indicated by reports from distributors.

Borates. The demand for straight borates in 1954, comparable to 1953, has remained relatively static for the past four years.

Chlorates. The trend continues away from straight sodium chlorate as a soil sterilant for agricultural and industrial weed control. Decreasing importance of sodium chlorate, inherently an excellent sterilant, to a great extent is due to its inflammable character when combined with organic material.

Borate-chlorate Mixtures. The continued upward trend of borate-chlorate mixtures, gradual over the past several years, was reflected in both agricultural and industrial weed control.

Carbon Bisulphide. There were at least 1,254,380 pounds of carbon bisulphide (CS_2) used during 1954 for the control of such deep-rooted perennials as Russian knapweed (*Centaurea repens* L.) and wild morning-glory (*Convolvulus arvensis* L.) in Fresno, Merced, Santa Clara, San Joaquin and Stanislaus Counties. Compared with 1953, this figure represents a slight decrease in volume. With the great array of weed killers on the market, carbon bisulphide is an outstanding example of a chemical that fulfills a specific need. Cropping may follow treatment with little delay.

CMU. CMU known chemically as (3-(P-chlorophenyl)-1), 1-dimethyl urea and also by the alphabetical nickname or symbol alluded to above, was recently given the trade names¹ of "Telvar" for industrial weed control, and "Karmex" for agricultural weed control by the manufacturer.

Of interest is the following brief progress report on the use of CMU for roadside control of yellow star thistle and puncture vine, initiated in Siskiyou County during 1953 by the county department of agriculture. Winter applications of CMU, varying from 20 to 40 pounds per acre, were made in treating many miles of county roadsides. Generally results were satisfactory; however, timing of application remains to be further explored. It appears that for the Siskiyou County situation CMU should be applied during February or thereabouts for best results in the control of yellow star thistle and puncture vine.

CMU, relatively insoluble in water, does not lend itself to unrestricted use as a soil sterilant. As a general rule it does not readily penetrate most soils, hence it tends to wander away from treated areas. Users not taking this factor into account may run into trouble by injuring valuable agricultural crops. During the year there were several cases of extensive damage to orchards from roadside and ditch bank applications.

Contact Dinitros. The upturn in general contact dinitros noted in 1953 continued in 1954. Primarily confined to fortifying oils for general weed control such as ditchbank, roadside and fence line applications, they were also used for weed control in orchards and citrus groves. The demand for dinitro sprays in alfalfa and clover seed curing was maintained.

Selective Dinitros. The increased use of selective dinitros for the control of mustard in grain in the southern San Joaquin Valley offset losses elsewhere. The

¹ Trade names used solely for identification purposes.

downturn noted in 1953 has now leveled off. Selective dinitros continued in demand for weed control in garlic and onions in the Salinas Valley.

IPC (isopropyl-N-phenyl carbamate). The use of IPC for the control of annual weedy grasses, such as in ladino clover, continued to decline. The downward trend apparently was associated with the decrease in ladino clover for seed production.

Aromatic Weed Oils. The present situation in aromatic weed oils, is taking on a new outlook. To maintain present volume, greater emphasis unquestionably must be placed on marketing in view of competition from newer herbicides. During the year increased demand for aromatic weed oil in the central valleys was to a considerable extent offset by decreased use in Southern California.

Selective Weed Oils. The use of selective oils for weed control in carrots and celery continued in normal demand.

Ammonium Sulfamate. The past year witnessed a modest increase in the use of ammonium sulfamate, commonly known as "Ammate."¹ Increased interest is partly due to the hazards involved in using 2,4-D for the control of woody plants, such as poison oak, in the vicinity of susceptible agricultural crops or valuable plants.

STCA (Sodium trichloroacetate). Sodium trichloroacetate continued in slack demand. Conditions precisely correct for optimum results coupled with relatively high control costs apparently have discouraged any great use of this material.

Special Weed Problems

Austrian Fieldcress (*Rorippa austriaca*). According to Loring White, Agricultural Commissioner of Modoc County, "The Austrian fieldcress program this year consisted largely of the airplane spraying of 300 acres of meadow in which the infestation was so light and so badly scattered that it could not be handled efficiently by spot treatment with ground units. Two pounds of parent acid (2,4-D) in amine form were used in five gallons of water per acre, with results even better than expected."

Bluemead (*Helianthus ciliaris*). James W. Koehler, District Supervisor of Rodent and Weed Control, in reporting the bluemead situation, points out significant developments. Mr. Koehler summarizes the situation as follows: "The remaining small infestations of this noxious perennial weed are gradually being reduced in size. The eradication program in San Bernardino County has resulted in such a substantial reduction of the bluemead infestation that the county requested their service agreement, whereby the department shared in the cost of eradication, not be renewed for the fiscal year 1954-1955.

"A new bluemead infestation consisting of several hundred square feet was discovered this year in Ventura County."

Camelthorn (*Alhagi camelorum* Fisch.). One of the most interesting three-way weed control projects begun during the spring involved control of camelthorn in Afton Canyon, a remote area about 45 miles east of Barstow, San Bernardino County. In the bottom of a steep-walled and winding canyon of the Mojave River, camelthorn in light to dense stands, occurring alone or in association with mesquite, tamarisk and other woody plants for a distance of six miles, infests approximately 200 acres of gravelly and boulder-strewn area.

Project operations got under way after three years of testing methods and procedure of control. Concerning the development of the project from test plot work, James W. Koehler comments that "the low volatile ester of 2,4-D appeared to be the most successful" material on the basis of 27 test plots which involved multiple treatment procedure. Relative to project operations, Mr. Koehler wrote the following:

"Because of rough terrain in the canyon, ground application of a spray material was not considered feasible; in the spring of 1954 aircraft pest control operators were invited by San Bernardino County to bid on an aerial application of 2,4-D. At this time, the county entered into an agreement with the department, under Section 159 of the Agricultural Code which provides that expense of eradicating camelthorn shall be borne one-third by the State, one-third by the county in which is located the land on which such camelthorn exists and one-third by the owner of such land.

"The first application of the low volatile ester of 2,4-D was made by airplane in May, 1954. The material was applied at a rate of four pounds of 2,4-D per acre in ten gallons of water. Subsequent retreatments of the entire infested area were made by airplane during July and September. Inspection of the treated area throughout the summer indicated results of treatments during 1954 are following the results of the first full year of test plot applications.

¹ Trade name used solely for identification purposes.

"On October 8, 1954, the department was informed by the San Bernardino County Agricultural Commissioner's office that a 10-acre infestation of camelthorn had been discovered on the northern outskirts of the Hinkley farming area, several miles west of Barstow. This 10 acres had been developed as farm land during World War I and abandoned probably in the early 1920's. From the appearance of the infested area, camelthorn had apparently been sown as an impurity in alfalfa seed. Although the camelthorn plants had grown particularly well in this area and undoubtedly had received their start by irrigation, no plants were found outside the boundary of the 10 acres. The infested area had been grazed by livestock many times during the past years. If seed was carried outside the area, it failed to germinate, or more likely, the seedlings failed to survive under desert conditions. Surveys had been conducted on long abandoned farm property and on property in this desert area which has been farmed since early in the century, but no additional infestations of camelthorn have been found.

"Satisfactory control work on camelthorn continued in Kern and Riverside Counties where remaining small infestations are gradually being reduced by use of the sodium arsenite-jar method and by applications of carbon bisulphide."

On June 10 the department was informed by A. L. Seeley, Agricultural Commissioner, of a new camelthorn infestation in Contra Costa County. The infestation occurs on the Orwood Tract in the Brentwood area and involves approximately one-half acre. Mr. Seeley believes it "probably was brought into this ranch on farm leveling machinery that had been used in Arizona." An eradication program was implemented following the discovery.

Gaura (Gaura spp.). *Gaura*, a primary noxious weed, has never assumed a role of major proportions in California primarily because of the vigilance exercised in its control. The plant, a perennial, grows vigorously where soil moisture is abundant, but persists under dry land conditions. Species of this plant, established in Southern California and scattered as far north as Livermore, are troublesome in citrus groves, grain fields and pastures. Generally the *gaura* situation during the past year was comparable to 1953; however, a report from Alameda County is of interest.

Wilbur M. Shrader, Deputy Agricultural Commissioner, reports:

"The infestation of *gaura* in Alameda County (at Livermore) approximates a generally infested area of 25 acres with the focal spots of actual infestation within this area totaling about 40 square rods.

"All treatments made during the year were on a spot treatment basis, and not on specified amounts per any given area.

"On July 28, a 2,4-D application was made, using the low volatile ester. Soil sterilizing practices were carried out on October 6 and 14, and on November 3 and 17. This was done by using a chlorate-borate mixture at the rate of one pound per gallon of water and spraying each plant sufficiently to obtain a sterilizing effect. A total of 203 pounds of material was used during the year. Many of the plants were very small, even difficult to see and easy to miss, so that the spray material was applied to the soil as well as the plant as each individual plant was treated."

Halogeton glomeratus. Recent events bring the *Halogeton* program into clearer perspective and are reviewed in subsequent paragraphs. Graham Randall, District Supervisor of Weed Control, reports the activities of the county-state *Halogeton* project in Lassen County for 1954 as follows:

"The county-state project for the control of *Halogeton* was continued through the 1954 season on the same organized basis as initiated in 1953. Density of larger infestations has been greatly reduced and some smaller areas have been completely controlled. Reinfestation of previously controlled areas was very slight during the season although potential reinfestation remains a threat.

"A more extensive survey of new areas was made by department personnel during the growing season. It was necessary to employ aircraft and horses as well as jeeps to conduct the survey because of the extensiveness and inaccessibility of the areas. As a result of this survey, approximately 200 acres of new infestations were found. The largest area contains approximately 90 acres, and the balance is in smaller areas of scattered plants and spots up to 20 acres in size. These areas are widely spread over extremely mountainous terrain and not adaptable to treatment with ground equipment available at present.

"Ground equipment was used to treat 180.35 acres of *Halogeton*, representing all previously known infestations. This is a reduction from 268 acres requiring treatment during 1953. Sixty-one acres were treated the second time during the season giving a total of 241.35 acres treated by ground equipment. Aircraft was employed

to treat 200 acres of the new areas found during the survey. The total area of Halogeton requiring treatment under the county-state program approximated 380 acres. This gave a new increase of 112 acres over the 1953 season. Results of the control work were very satisfactory where ground equipment was used; however, because of lateness of the season at time of discovery and the advance maturity of the plants at time of treatment, the areas sprayed by aircraft were not successfully controlled. Earlier spraying and adjusted dosage rates are expected to rectify this situation.

"As noted in last year's report, the problem is becoming one of survey and mapping rather than control. However, both aspects of the eradication program have been complicated by the remoteness and difficulty of the terrain in which the newest infestations were found."

The Sierra Ordnance Depot at Herlong, continuing their Halogeton control program on approximately 4,000 acres within depot boundaries, reportedly sprayed the infested area once over with the low volatile ester of 2,4-D.

During the year an appraisal of the Halogeton problem in Lassen County was made by representatives from federal, state and county agencies. In their committee report apparent deficiencies in the program were noted as follows: (1) elimination of natural vegetation as a source of competition; (2) inconsistency of climatic factors effecting the over-all germination period; (3) difficulty in conducting a comprehensive survey of suspected areas because of terrain; and (4) further information is needed on spread of seed by wind and water and effectiveness of various spray materials at different stages of development.

Their recommendations for future improvement of the program were as follows: (1) the expansion of the survey by use of horses and aircraft; (2) investigation of the use of desert grasses and shrubs as competitive plants and the possibility of utilizing fertilizers and reseeding to improve composition of the natural vegetation; and (3) further determination of effectiveness of various spray materials at the different growth stages of Halogeton.

During September the annual Halogeton survey in areas other than Lassen County was conducted by bureau representatives. The survey, primarily aimed at areas adjacent to the state border in Alpine, Mono and Inyo Counties, included locations in Imperial, Riverside, Kern and Fresno Counties. In the last four counties the bureau was assisted by respective county departments of agriculture.

Presently Halogeton infestations occur at Yerington, Hawthorne and Tonopah, Nevada, all of which are 40 to 50 miles east of the California boundary; however, major highways running through the areas present a potential source of trouble. The results of the survey were negative, and as far as known Halogeton in California remains confined to the Lassen County location.

The five-year longevity germination experiment of stored Halogeton seed, conducted by the State Seed Laboratory, now is in its fourth year with a total of six tests. The tests originally conducted twice a year are now on an annual basis, for it is apparent that the winged or papery bract seed, commonly spoken of as "black seed" in other states, may have lost their viability completely. To gain further information concerning this point and more particularly the longevity of the indurate bract seed, referred to in other states as "brown seed," the original five-year program was extended. The indurate bract seed appear to be quite long-lived, as indicated in the tests. This longevity factor will be an important element for consideration in the control program. The results of the longevity tests, to date, are reported as follows:

LONGEVITY TEST ON HALOGETON GLOMERATUS

Sample Contains Seeds With Both Papery and Indurate Bracts

	<i>Seeds with papery bracts</i>		<i>Seeds with indurate bracts</i>	
	<i>Days in test</i>	<i>Germ percent</i>	<i>Days in test</i>	<i>Germ percent</i>
1st test				
December, 1951 --	110	75	110	0
2d test				
June, 1952 -----	18	90	110	0
			(A few seeds with bracts removed germinated at once)	
3d test				
December, 1952 --	20	12	136	0

4th test					
June, 1953	-----	28	4	100	0
					(Bracts were removed from 50 seeds. 38 ger- minated)
5th test					
December, 1953	--	10	All seeds dead and moldy. Test discon- tinued in 10 days	6 months	0
6th test					
June, 1954	-----	18	All seeds dead	Test held 6 months	0
					(Bracts removed from 50 seeds. 34 germinated)

Leafy Spurge (*Euphorbia Esula*). As indicated in 1953, the control of leafy spurge is exceedingly difficult. The control of this plant by test plots was further explored in 1954. The low volatile ester of 2,4-D applied in a multiple treatment procedure continues the most promising selective material tested. Further tests with soil sterilants were made.

Klamath Weed (*Hypericum perforatum*). The following progress report on biological control of Klamath weed, by James K. Holloway, Entomologist of the Insect Identification and Parasite Introduction Section, Agricultural Research Service, United States Department of Agriculture, summarizes the great progress made in the control of Klamath weed in California. This well known activity, a cooperative project of the United States Department of Agriculture and the University of California Agricultural Experiment Station at Albany, is a classic example of weed control by insects. During the 10 years that have elapsed since the first beetles (*Chrysolina* spp.) were introduced from Australia, great progress in the control of Klamath weed has been witnessed. Highlights concerning recent developments of this program, which affects two and one-third million acres of grazing land in northern California, are best told by Mr. Holloway:

"The leaf-feeding beetles, *Chrysomellids*, continue to make excellent progress with the greatest degree of control exerted in the coastal counties. In the Sierra foothill counties the beetles have from natural spread become almost universally distributed and within the next two years it is believed that very satisfactory control will be effected. In Northern California, Shasta County still appears to be a minor problem. Considerable control has been obtained but not as thoroughly nor in so short a time as the control achieved in other areas. This is mainly due to a slower and more erratic rate of increase in beetle populations resulting from unfavorable environmental conditions. It is possible that the root borer, *Argilus*, may ultimately be the solution to the problem in this county.

"In Humboldt County the effective control is still most apparent and so far each year there has been a continual lowering of the weed population over the preceding year. The carrying capacity of the ranges has increased, the value of the land has advanced three-fold and there is no longer any large expenditure of money in the county for the control of Klamath weed.

"The root borer, *Agrilus*, has also proved itself in Butte, Placer and Shasta Counties. At present the competition with the *Chrysolina* is so great that the ability of *Agrilus* is overshadowed. But it has the ability to increase under conditions not entirely favorable to *C. gemellata*, and it is possible at some time in the future this borer may play an important part in the control of Klamath weed.

"The gall fly, *Zeuxidiplosis*, continues to increase under very limited conditions, mainly in seepage areas where the plants make growth during summer months. At the present time the potentialities of this insect for ultimate control of Klamath weed in California are quite restricted and questionable.

"Ecological Studies: Plot studies in Shasta County near Loftus Post Office have shown good control of the weed in three of the four distance zones—the next to farthest (one mile) distance exhibited definite persistence although weakened condition of the stand. Both partial shade and soil condition may be involved. Further thinning out is expected."

Perennial peppergrass (*Lepidium latifolium* L.). In the spring of 1953 Milo M. Schrock, Agricultural Commissioner, initiated a project for the control of perennial peppergrass on 365 acres of farming lands along the Tuolumne and San Joaquin Rivers in Stanislaus County. This activity aims at "eradication as the final goal." In a progress report submitted to the bureau, Mr. Schrock states that during 1954,

"All of the known infestations in the county were treated" (with the low volatile ester of 2,4-D). In summary he concludes, "The area of the infestation is nearly as large as when the program started two years ago"; however, "the density of infestations has been reduced by about 75 percent."

During the year test plots were established for the control of perennial peppergrass in the Lisbon District of Yolo County. The tests in cooperation with Charles H. Hardy, Agricultural Commissioner, include the use of hormone-type weed killers and soil sterilants.

Quackgrass (*Agropyron repens*). To alleviate the quackgrass problem in California, particularly in nurseries, test plots in several nurseries were begun in 1951 to explore the use of chemicals. Results of that work were reported in 1952. It is of interest to note the results of tests since that time. Briefly, CMU continues to prove effective for control of quackgrass in storage areas, sales yards and other places where the chemical does not come in contact with growing plants. Dalapon,¹ a new plant growth regulator for grass control, proved quite effective on quackgrass in preliminary tests. Future tests will include observations concerning the effects of this material on nursery plants.

Russian knapweed (*Centaurea repens* L.). Russian knapweed, one of the major weeds of California growing throughout the warmer sections of the State, constitutes a serious problem for farmers particularly along the western side of central San Joaquin Valley. Rainfall, greatly lacking in this semi-arid region and an important factor where soil sterilants are used for weed control as in the case of Russian knapweed, must be substituted in many places by irrigation. Other controls include cultural methods, or more specifically ecological control, where the unwanted plant is crowded out by smother crops. In the Los Banos area alfalfa for hay production and permanent pastures for grazing lend themselves well to this type of control. Successful control by hormone-type weed killers throughout the valley at present seems doomed because of two very considerable obstacles: (1) Russian knapweed plants are resistant to these materials because of drought conditions; and (2) the diversity of broad-leaved crops in the area greatly restricts the use of 2,4-D and similar materials.

The report of John I. Polson, supervisor of the weed program for the Fresno County Department of Agriculture, shows the great effort this agency has made to cope with the Russian knapweed situation in Fresno County: "We have treated 759 acres of private land and 1,247 miles of county roadsides for Russian knapweed, morning-glory and white horse-nettle. This work cost a little over \$115,000." Concerning the program Mr. Polson states: "The results in general have been very good." An exception to the general situation is pointed out in his observation that "results have not been very good" in those instances where it was difficult to leach soil sterilants uniformly over diked areas because of uneven topography.

Cooperative Russian knapweed test plots established by the bureau at Mendota in 1952 are still in progress. The natural environmental condition pointed out in the foregoing paragraph is a difficult obstacle to overcome. Test plot results have been more or less negative, to the present.

Other Weed Problems

Brush Control. The control of woody plants in and along water channels of flood control, reclamation and irrigation districts presents an ever increasing problem throughout the State. The extensive network of natural and man-made water channels, increased irrigation in the warmer regions and the profuse growth of woody plants and other species in drainage and distribution systems have focused attention on two serious problems: (1) destruction to farm lands and other property by winter floods from clogged channels; and (2) water losses during the growing season by reduced carrying capacity and by transpiration from plant growth.

Foliage applications of 2,4-D and similar growth regulators to plant growth in the above situation present a considerable risk because of the potentialities for spray drift to susceptible crops. Basal stem and dormant sprays during the winter often are resorted to in an attempt to obviate this trouble. Bureau representatives set up test plots of this nature in several counties to assist agricultural commissioners make control recommendations to agencies which sought advice.

Electric Weed Control. As reported in 1953 the electrical control of such pests as Russian knapweed and wild morning-glory (*Convolvulus arvensis* L.) has been attempted intermittently for the past 10 years at Mendota and elsewhere. Various small individual groups over the years have manufactured a machine known as the

¹ Trade name used solely for identification purposes.

"Electrovator" to kill deep-rooted perennial weeds with electricity. It is the feeling of the bureau that effective control of such weeds by electricity as mentioned above is yet to be demonstrated in this State.

Distaff Thistle (*Carthamus lanatus*). The spread of distaff thistle, an annual with deeply cleft leaves armored with prickly spines, is of increasing concern in Orange County where it is a range pest in the Brea-Olive district. The plant, scattered at various points in the State, generally has not assumed the character of a serious weed pest. Evidently in the Orange County situation the plant has found ecological conditions very much suited to its natural spread. Control in the Brea-Olive area, by the county department of agriculture is running into the obstacle of seeking out and controlling difficult-to-find depauperate plants over great expanses of wild range lands. Plants when found in the early growth stage may be easily controlled with 2,4-D or by grubbing.

Gorse (*Ulex europaeus* L.). Richard H. Dana, district supervisor of rodent and weed control, closely associated with the gorse control program in his district, credits "the extremely favorable developments in gorse control" realized during 1954 to the "great interest shown by agricultural commissioners in the control of this serious range pest." Mr. Dana, to illustrate the extent of the gorse problem, observes that, "In 1951 a bureau survey revealed approximately 15,353 acres of grazing lands infested with gorse in six California coastal counties, including Santa Cruz, Marin, Sonoma, Mendocino, Humboldt and Del Norte." He states that in view of the situation "present developments are most gratifying."

The voluntary gorse control program for ranchers in Sonoma County, initiated in 1953 by Percy F. Wright, Agricultural Commissioner, was well received. Description by Mr. Wright of the character and extent of gorse control in his community shows the degree of progress made:

"In the latter part of January we attempted to control gorse by burning. We used 100 gallons of Diesel oil. It was felt that by getting a hot fire started it would continue to spread from its own heat. This was not true. Gorse will only burn where the clumps are quite old and extremely thick. The 100 gallons of Diesel oil which we used only lasted a short time for we had to continue feeding the flames to keep the gorse burning. Following this experience we used brush killer at the rate of one gallon to 100 gallons of water. This work was started in the latter part of January and continued through April with excellent results. We did find that full coverage was required. If one stem was not sprayed it continued to remain alive."

Concerning the extent of the work, Mr. Wright reports over 2,600 acres of gorse were treated on four ranches; adjacent county roadsides were also sprayed. He further indicates the extent of the problem by mentioning the manner in which the infestations were treated.

"Not all of the gorse was treated on these ranches. The work was confined to the smaller clumps."

The following comments of Mr. Wright are of historical note for they show that Klamath weed, once regarded as the major range weed pest in the county, no longer holds that position and gorse has assumed the leading role: "In November of this year the board of supervisors authorized me to make a transfer of Klamath weed funds to gorse weed funds. * * * The board also allows me to use this money on gorse control at my own discretion. We may work on private property. The deal which I made with the farmers last year was that we would furnish one gallon of weed killer as demonstration and if they cared to have more work done, they would pay for any material over and above one gallon. We intended to proceed with this work again this year on the same basis."

Gorse control in Mendocino County, according to Theodore Ericksen, Jr., Agricultural Commissioner, "consisted of locating patches * * * isolated from the main infestations and the treating of such isolated infestations * * *." Individual plants have been found as far as eight miles east of the original infestations. We hope at least to confine gorse to the original area of infestation before working on main portions of the original infestation.

Relative to the work in Humboldt County, W. Donald Thomas, Agricultural Commissioner, reports: "Our control operations for gorse this past year consisted of treating approximately 35 acres with 2,4,5-T."

In commenting upon the Del Norte County situation, L. J. Garrett, Jr., Agricultural Commissioner, notes: "All gorse in Del Norte County was treated in April of 1954. * * * We have two infestations covering approximately 12 acres located near the junction of Highways U. S. 99 and 101 at Crescent City."

A progress report of the gorse biological control project¹ is summarized by James K. Holloway as follows:

"In March a shipment of gorse seed weevils was received from France. The material was divided into two lots of 84 females and 60 males each, and a release was made in San Mateo and Mendocino Counties. In October recoveries were made at both release sites. The adults were a new generation resulting from the releases that spring. The distribution was very much localized but within the small area of release the adult weevils were quite abundant.

Mediterranean Sage (*Salvia Aethiopis* L.) The campaign against Mediterranean sage in Lassen and Modoc Counties continues unabated. This pest, while currently a localized problem, constitutes a threat to grazing lands in the northern part of the State. The plant, a biennial, produces seeds in great abundance. The appellation, "serious range pest," is readily understood in view of the weed's past performance in Lake County, Oregon, where it now infests 200,000 acres of land.

Relative to the situation in Modoc County, Loring White comments: "We are still fighting Mediterranean sage on our own. We have found 29 separate infestations in the county ranging from a few plants to one area about one-fourth mile wide by three miles long. None of these infestations can be considered as well established and none threaten to be a source of further infestation, for no plants are allowed to seed."

Scattered infestations comprising about 300 acres in the vicinity of Susanville, Lassen County, are being successfully controlled by the county department of agriculture. Control methods include the use of 2,4-D, oil sprays and hand hoeing.

Scotch Broom (*Cytisus scoparius*). Concerning the Scotch broom program in Amador County, recent developments are of interest. This program, implemented in 1952, is an excellent demonstration of the old adage: An ounce of prevention is worth a pound of cure. Raymond Rebuffo, Agricultural Commissioner, heading up this county-organized project, reports developments for 1954:

"During 1954, control was carried out on 222 properties at a cost of \$1,181.19. This cost includes survey, control and administration. The 1953 program cost \$2,163.15. From the cost standpoint it is readily evident that headway is being made; however, this does not indicate that the fight is won. There will be seedlings to contend with for the next decade plus the fact that logging equipment can move seed and infestations could become established in inaccessible areas.

"The 1954 control program consisted primarily of the control of seedlings which have sprouted where old plants were removed the prior year, the continued removal of large plants that were overlooked and contacting people who refused removal and absentee owners. Offhand I would guess that over 90 percent of the original infestations have been removed. The largest single remaining infestation is about one half acre on the property of a party who refused to cooperate. The rest of the infestations comprise one or two plants in yards missed last year.

"An aerial survey was made of the lower half of the county during the blossom season and no infestations were sighted."

The control of Scotch broom by ordinary means in long and well established areas seems out of the question. Realizing that the problem in El Dorado County was too great to be handled by the county alone, the board of supervisors in 1952 directed a survey of the infested area. The survey revealed a total of 27,738 acres of forest and agricultural lands infested. Following the survey an appeal was made to federal and state agencies, requesting help with research in three phases: (1) exploration of the possibility of biological control; (2) best economic material for chemical control; and (3) a method of application for control in large and often inaccessible areas. Relative to biological control, there may be a chance to control spread of the plant by destruction of its seed and foliage.

Concerning such a possibility, James K. Holloway observes: "Preliminary investigations¹ have been made on the possibility of introducing insects to control this plant. There are 10 insects recorded from Scotch broom, nine of these are already in the United States and are not particularly destructive. The tenth, a moth which destroys foliage, is at present being experimented with in Hawaii, and the progress of the work will be followed."

¹ Cooperative project, Agricultural Research Section, United States Department of Agriculture and the University of California Agricultural Experiment Station, Albany, California.

As indicated in the foregoing paragraphs, there is a great awareness on the part of official agencies concerning spread of Scotch broom to valuable grazing lands. In this connection it is of interest to note that a Scotch broom survey was conducted in Mendocino County during the past year. Relative to this survey, Theodore Erickson, Jr., observes: "Many people have found it desirable in the past to plant Scotch broom as an ornamental around their homes in nearly every section of Mendocino County. In many such instances the Scotch broom has naturalized itself outside the garden fence and exists in such locations today.

"Scotch broom grows very well in nearly every section of Mendocino County and covers several thousand acres, mainly in the western section of the county.

"During 1954 35 mm. Kodachrome slides have been made by this office to be used in acquainting people to the danger of further encroachment by Scotch broom, as well as gorse and other noxious weeds that exist in the county. We are making every effort to inform the people of the 'weed situation' throughout the county through the use of such visual material at Farm Center and other public meetings throughout the county."

SUMMARY OF EXPENDITURES FOR WEED CONTROL FROM REPORTS OF 47 OF THE 52 COUNTY AGRICULTURAL COMMISSIONERS

Alameda	\$6,794.88	Plumas	\$17,601.18
Amador	6,420.15	Riverside	13,325.08
Calaveras	1,547.19	Sacramento	12,383.07
Colusa	9,625.22	San Benito	13,089.69
Contra Costa	2,842.53	San Bernardino	4,391.78
El Dorado	2,164.99	San Diego	26,305.30
Fresno	134,741.06	San Joaquin	6,361.01
Glenn	292,253.00	San Luis Obispo	12,849.50
Humboldt	5,755.83	San Mateo	2,848.61
Imperial	93.19	Santa Barbara	13,627.00
Kern	405.11	Santa Clara	4,430.01
Kings	677.60	Santa Cruz	592.43
Lake	2,023.39	Shasta	22,832.74
Lassen	8,214.21	Siskiyou	4,568.94
Los Angeles	13,900.69	Solano	7,549.60
Madera	19,686.32	Sonoma	2,879.56
Marin	248.90	Stanislaus	52,480.96
Mendocino	955.55	Sutter	6,588.12
Merced	14,411.58	Tehama	6,622.50
Modoc	6,761.59	Tulare ¹	—
Monterey	1,527.62	Tuolumne	300.00
Napa	2,430.03	Ventura	2,338.66
Orange	17,601.18	Yolo	22,940.98
Placer	4,660.52		
Total			\$806,869.95

¹ By county road department and private individuals.

MATERIALS USED AND COSTS

Sodium chlorate	{ 338,808 pounds } 7,740 gallons }	\$39,496.06
Borate-chlorate mixtures	{ 259,036.5 pounds } 64,619 gallons }	101,262.17
Petroleum oils	{ 586,285.55 gallons } 57,558 pounds }	63,960.34
2,4-D salts	{ 2,506.97 pounds } 17,308.75 gallons }	63,732.35
2,4-D esters	{ 445 pounds } 724 gallons }	7,017.02
2,4,5-T	{ 290 pounds } 129 gallons }	2,199.11
Dinitro	{ 813 pounds } 8,992 gallons }	11,483.88

Carbon bisulfide-----	{ 215,201 13,163	pounds gallons }	28,622.52
TCA-----	228	pounds	84.92
Arsenicals-----	1,378	gallons	488.95
Sulfur-----	10,117	pounds	395.49
Borax-----	4,825	pounds	123.18
Ammonium sulfamate-----	1,700	pounds	533.50
CMU-----	{ 3,869 56	pounds gallons }	11,725.43
MCP-----	3,818	gallons	21,949.72
Brushkillers-----	{ 420 302	pounds gallons }	5,927.04
Dalapon-----	92	pounds	73.60
Total-----			\$359,075.28

Weed Meetings

The Sixth Annual California Weed Conference held at the Odd Fellows Temple, Sacramento, January 27th and 28th, was devoted to the discussion of weed control investigations, local weed problems and special weed problems.

The annual halogeton meeting was held at Susanville during April. Federal, state, county and private agencies represented were the United States Bureau of Land Management, Sierra Ordnance Depot, California Department of Agriculture, Lassen County Department of Agriculture and the Southern Pacific Railroad Company. The purpose of the meeting was to coordinate activities of the above-mentioned co-operators in the Lassen County halogeton project. Former meetings were held in 1952 and 1953.

Weed Control by the State Division of Highways

The following tabulation by G. T. McCoy, State Highway Engineer, summarizes allotments made to districts for fire hazard and noxious weed control along state highways for the period January 1, 1954, to December 31, 1954:

CHART NO. 1

State of California, Division of Highways—Roadside Weed Control January 1, 1954, to December 31, 1954

Fire hazard control				Noxious weed control	
District	Total allotment	Roadside miles	Total allotment	Work done by	
				State forces	Under service agreement by these agricultural commissioners
I-----	\$7,720.00	160.00	\$5,348	\$4,820	\$528 Lake
II-----	6,376.00	190.00	1,450		1,450 Shasta, Siskiyou, Lassen, Plumas
III-----	8,263.75	366.45	12,000	9,000	3,000 Yolo, Sutter
IV-----	21,360.00	379.20	2,850	1,700	1,150 Santa Cruz, San Mateo, Sonoma
V-----	25,100.00	526.30	9,173		9,173 San Benito, Monterey, San Luis Obispo, Santa Barbara
VI-----	25,110.00	594.00	22,350	22,350	
VII-----	14,017.05	363.21	4,600		4,600 Ventura, Orange, Los Angeles
VIII-----	12,300.00	296.75	11,720	11,720	
IX-----	1,700.00	30.00	220	220	
X-----	18,000.00	637.10	26,365	5,000	21,365 Amador, Calaveras, San Joaquin, Stanislaus, Solano, Tuolumne
XI-----	6,440.00	170.40	4,000	4,000	
Totals --	\$146,386.80	3,713.41	\$100,076	\$58,810	\$46,266

Pest Abatement Districts

According to Loring White, "There is nothing spectacular to report on the operations of the Lookout or the Stronghold Pest Abatement Districts in Modoc County"; however, "both districts were active in their respective fields. At Lookout two power sprayers and necessary materials were used by individual ranchers to spray whitetop and Russian knapweed. We assisted with one of our rigs for a week in cleaning up some bad infestations on some places that were being neglected.

"The Stronghold district sprayed canal banks for general weed control. This work has progressed to a point where they are considering expanding their activities somewhat in fighting quackgrass infestations along canal banks with soil sterilants."

Reviewing the activities of the Big Valley Pest Abatement District in Lassen County, Ernest E. Fix, Agricultural Commissioner, concludes that the showing in 1954 "was the poorest year * * * since the district was formed." Mr. Fix states that district operations, slow in getting started because of a lack of planning, were not carried through to completion because of labor trouble. To expedite the difficulty, the agricultural commissioner's office "continued to spray some of the district's weeds with what little material they had left." Summarizing the total operations, Mr. Fix reports 249 acres of white top, one and one-half acres of Russian knapweed and 4.6 acres of yellow star thistle were sprayed with 2,4-D.

The Big Bear Weed Pest Abatement District at Big Bear Lake, San Bernardino County, formed in 1947 for the purpose of controlling aquatic weeds, never has functioned because of drought conditions. Receding water in the lake has temporarily eliminated the problem for which the district was formed. Periodically test plots have been set up above the low water line to determine the best method and procedure of control in this area. According to C. E. Pratt, Deputy Agricultural Commissioner, current test work included trials with a borate compound and a combination of 2,4-D and borax.

PLANT IDENTIFICATION AND SURVEY

MARGARET K. BELLUE, *Weed and Seed Botanist*

During 1954 there were 5,406 identifications made; 5,088 were reported from Sacramento and 318 from Los Angeles. Information relative to growth performance, poisonous properties, probable origin and other pertinent information was supplied in connection with many of the specimens submitted.

The specimens received for identification in connection with border quarantine interceptions included some potentially propagable material of noxious weeds. Mature seed of Canada thistle, *Cirsium arvense*, recurred frequently, also white hosenettle, *Solanum elaeagnifolium*, Johnson grass, *Sorghum halepense*, and puncture vine, *Tribulus terrestris*. Quackgrass, *Agropyron repens*, sandbur grass, *Cenchrus pauciflorus*, and poverty weed, *Iva axillaris*, were included.

The weed and seed botanist met with several agricultural commissioner and veterinary groups to discuss problems pertaining to plants toxic to livestock, appeared on TV and radio programs in this connection and presented papers before the American Society of Range Management at Berkeley and the Annual Weed Control Conference at Sacramento.

The following weeds are of significance because they represent first records, extension of range, or encroachment of species previously considered innocuous:

Alhagi camelorum, camel thorn, was reported established in an alfalfa field in the Orwood tract, Contra Costa County, in May, 1954.

Andropogon glomeratus, tawny beardgrass, of relatively rare occurrence in Southern California, was submitted for identification from San Gabriel Canyon, Los Angeles County. This grass, although slow to become established, spreads steadily once a foothold has been gained. It seems to be avoided by all classes of livestock.

Asclepias erosa, woolly-pod milkweed, was suspected in the death of a goat which fed on it in Los Angeles County in June.

Cannabis sativa, marihuana or hemp, was received for identification from a roadside, Canoga Park, Los Angeles County, and from the delta region in Sacramento County. On numerous instances plants were determined for narcotics enforcement agents in connection with marihuana suspects.

Carduus nutans, nodding thistle, was collected on the San Vicente Ranch at Walnut, Los Angeles County, in June. This represents a first record for California. Nodding thistle is reported as an adventive at scattered locations in the eastern United States and Canada, and in British Columbia. It was first reported in Texas

in 1940 and, according to Tom Howell of the California Academy of Sciences, is now found in several other western states, including Nevada. *C. nutans* is a native of Eurasia, biennial in habit. Seed of this thistle is reported by the Los Angeles branch of the seed laboratory as occurring in oats from Argentine. Canadian sources list it also as an impurity of Argentine rape seed.

Carthamus boeticus, distaff thistle, is persisting in the Chileno Valley about two miles from Petaluma, Sonoma County.

Centaurea sulphurea, first reported from Alder Creek, Sacramento County, in 1923, recently made a spectacular spread from the limited area to which it had been confined for the past 30 years. Extensive road work in connection with the Folsom Dam development is credited with occasioning the extension of this Mediterranean introduction along both sides of Highway 49 for a distance of over six miles. It is obvious that the seed produced in the 1953 season was abundant and of high viability, as witnessed by the dense stands of *C. sulphurea*. In most areas depauperate plants were produced due to competition from overcrowding. These depauperate 6-12-inch plants may tend to retard the rapid spread of the weed in the 1954-55 season. The pappus-bearing seeds shaken from typical 1½- to 3-foot-tall plants would be carried to considerably greater distances by the air currents created by passing traffic.

Centaureum floribunda, June centaury, which is occasionally received for identification in connection with livestock disorders, was again submitted in this connection from San Joaquin County.

Cirsium arvense, Canada thistle, was submitted for identification from a nursery in Castro Valley, Alameda County.

Convolvulus althaeoides was reported from the Lantz Ranch, Moreno. According to the Los Angeles branch seed laboratory, seed of this perennial weed occurs in canary grass from Morocco and Turkey.

Hypericum perforatum, Klamath weed, was submitted from the Crocker estate, San Bruno, San Mateo County, in November.

Isatis tinctoria, dyer's woad, was received for identification from Humboldt, Butte, Lake and Glenn Counties. It occasionally appears as a roadside waif.

Lepidium latifolium, perennial peppergrass, for many years limited to the Lisbon district of Yolo County and scattered locations in San Joaquin and Stanislaus Counties, is gradually making its appearance at distant sites, as at Los Angeles and Orange Counties. Orange County recently reported an infestation of approximately 25 plants located on both sides of a county road south of Barber City. An infestation also was reported from Contra Costa County in October, 1954.

Nerium oleander, oleander, occasioned the death of a 4H Club show animal when it ate the dried leaves which were incorporated in bedding straw at the exhibit barns.

Nothoscordum fragrans, false garlic, was received several times during the year from gardens in the Sacramento and Los Angeles areas where it was a serious pest.

Orobanche fascicularis, broomrape, is a native root-parasite which was submitted for identification from Palm Springs, Riverside County, where it proved a pest in a petunia bed.

Pteris aquilinum, bracken fern, was determined through a survey made in 1954 as the cause of a heavy sheep loss among sheep driven over the Sonora Pass Road and subsequently turned onto permanent pasture near Farmington on October 4, 1953, when the temperature was over 100 degrees.

Rapistrum rugosum, short-fruited wild turnip, regarded as a serious weed of cereal crops in South Australia, has been reported several times from the Los Angeles laboratory as an impurity in Argentine oats.

Salpichroa rhomboidea, lily-of-the-valley vine, usually reported from garden areas, was received for identification in October from a small avocado grove. This plant has a tendency to grow up through citrus or avocado trees and spread out canopy-fashion over the tops of the trees.

Scirpus tuberosus, tuberous-rooted bulrush, was received for identification from Merced County. This weed is exceptionally resistant to control measures on rice lands.

Setaria verticillata, bur bristlegrass, from the Delano area, Kern County, was submitted for determination in July.

Solanum torreyi, Torrey's nightshade, was introduced some time ago at a stock car siding of the Roseville railroad yards, but disappeared after about three years. In September of this year, Torrey nightshade was found growing on a Santa Fe siding near Corona.

CONTROL OF DISEASE-BEARING RODENTS

LAUREL L. ATKINSON, *Field Supervisor of Rodent Control*

There has been a continued re-evaluation of areas where field rodents are known to harbor diseases transmissible to humans. This re-evaluation is conducted by continuing survey by the State Department of Public Health, members of this bureau, and the county agricultural commissioners involved and is dependent upon the rodent population in relation to or in close proximity to heavy human populations.

Extensive work has been done under the supervision and guidance of the State Department of Public Health to further sanitary measures in these areas which greatly contribute toward the eventual control of the rodents. One of the most recent outbreaks of disease has been in San Mateo County in the vicinity of Colma and Daly City. This outbreak was among smaller field rodents such as *Peromyscus*, house mice, field mice and domestic rats, the latter confined primarily to hog ranches in the area where garbage was fed. Strict sanitation measures were invoked. Because of the location of this outbreak in an area of heavy human population and rough terrain, it was decided to apply the rodenticide by airplane application, a method employed for the first time. Results were quite satisfactory.

In Southern California the use of grain baits treated with anticoagulants such as Warfarin or Pival has continued effective in the control of small rodents in recreational areas. Pival-treated baits were used almost exclusively in the San Bernardino Mountain resort areas and proved effective for the control of chipmunks, golden-mantled squirrels and white-footed mice. Most of the bait material was used in bait boxes, but some areas were handled on an open bait exposure method. This year Warfarin was used for the first time in the recreational areas in Cuyamaca State Park for the control of small field rodents. All material was used in bait boxes. Considerable success was obtained in reduction of the rodent population.

In cooperation with the Bureau of Indian Affairs and the United States Fish and Wildlife Service, the Tule Indian Reservation, Tulare County, was extensively treated for control of ground squirrels; results were very satisfactory.

In areas where rodents harbor diseases, the following operations have been carried on in cooperation with the United States Fish and Wildlife Service and the counties involved:

Area treated	1,196,420 $\frac{1}{2}$ acres
Strychnine bait	8,185 $\frac{1}{2}$ pounds
Thallium bait	7,626 $\frac{1}{2}$ pounds
Zinc Phosphide bait	7,168 pounds
1080 (sodium fluoroacetate) baits	26,364 $\frac{1}{2}$ pounds
Red squill baits	293 pounds
Warfarin baits	3,449 $\frac{1}{2}$ pounds
Carbon bisulphide (#)	24,481 $\frac{1}{2}$ pounds
Carbon bisulphide (gallons)	3,181 gallons
Jute waste balls	25,536
Methyl bromide	69,980 pounds
Pival	2,906 $\frac{1}{2}$ pounds
Cost	\$107,639.66

ECONOMIC CONTROL OF RODENTS AND INJURIOUS BIRDS

ROLLO E. TALBERT, *District Supervisor, Rodent and Weed Control*

The reduction in size of plague areas has resulted in over one million acres being added to economic status for the control of ground squirrels.

The bureau has assisted with technical advice in the rodent control campaigns carried on in military reservations. On one of these (the Port Chicago Naval Ammunition Depot), bait acceptance has been very erratic. It is impossible to use carbon bisulphide or any material of an inflammable nature; therefore, operations have been confined to the use of methyl bromide, and the results have been very satisfactory. We have received excellent cooperation from all military branches in coordinating their work with that done on outside areas by the counties.

Following are the figures for economic rodent control work during the year:

<i>Pest animal</i>	<i>Area treated</i>	<i>Cost</i>
Ground squirrels	5,071,274½ acres	\$347,037.77
Rats and mice	6,203 premises	25,097.39
Meadow mice	10,643 acres	3,291.68
Gophers	110,103 acres	15,401.58
Rabbits	47,343 acres	3,814.74
Kangaroo rats	18,980 acres	761.61
Badgers	 acres	25.09
Moles	11 premises	30.84
Blackbirds	2,251 premises	1,531.90
Horned larks	137 premises	2,164.16
Linnets	1,146 premises	2,817.49
English sparrows	1,036 premises	1,791.19
Crowned sparrows	493 premises	1,489.34
Crows	29 premises	444.87
Magpies	9 premises	79.97
Others (miscellaneous)	41,862 acres	10,548.73
Total cost		\$416,328.35

<i>Material</i>	<i>Pounds</i>
1080 (sodium fluoracetate bait)	222,661
Strychnine bait	349,976½
Zinc phosphide bait	68,058
Thallium bait	1,634
Red squill bait	1,712
Warfarin bait and pival	41,557
Total pounds toxic baits	685,598

<i>Fumigants</i>	<i>Pounds</i>
Carbon bisulphide	177,332
Methyl bromide	9,351
Total pounds fumigants	186,683
Jute waste balls	332,334

Meadow Mice

Meadow mice continue to be a problem in the Delta area and mountain meadows; control has become a farming practice. Poison grain baits are the recognized means of control. Some spraying with toxaphene is still being done with varied results. One complaint of meadow mouse damage originated in Santa Clara County, where the mice were eating seeds from strawberry fruit. In another instance in Santa Cruz County the meadow mice were damaging artichokes; the mice climb up the plants and eat the stumps causing severe damage to the plants.

Kangaroo Rats

It has been reported from a number of districts, where extensive ground squirrel control has been carried on, there has been a gradual build-up of kangaroo rats which cause heavy damage to range feed. Control measures have been carried out in these areas with considerable success.

Gophers

Gophers continue to rank importantly among rodents causing damage to agricultural crops and irrigation and reclamation canals. The total calls for gopher control were a little lower than last year; however, the area treated is slightly larger.

Rats and Mice

Control in rural areas required considerable work and assistance from county agricultural commissioners and their staffs. A report was received from one area where rats caused the death of three newly-born calves. The cows were weak and unable to get up. According to the report, the rats ate into the vertebrae of the calves. Control was begun in this area, and results were satisfactory.

Coypu

Many farms have been established for the commercial raising of Coypu. It is necessary for breeders to secure permits; holding pens must be approved by the State Department of Fish and Game.

Jack Rabbits

The large jack rabbit population which occurred in Southern California during 1953 continued throughout 1954; greatest losses to crops were reported in the desert area. Alfalfa and young cotton plantings in the Mojave, Victorville and Antelope Valley areas suffered greatest damage. In the coastal section Ventura County reports a considerable loss to bean producers due to rabbit depredation.

In an effort to provide an effective control procedure, many different baits including fresh vegetables, fresh and dry alfalfa, several ground livestock feed mixtures and various grain baits including rolled barley have been used. Of these the most successful has been rolled barley. The procedure is to use this material first as a dampened prebait, placing the untreated baits in trails for two to four nights to encourage maximum acceptance. Immediately following the prebait, a dampened strychnine mix is used over the entire bait line. This procedure was followed in the Mojave area on a 10-mile bait line adjacent to crop and brush land. The resultant kill was estimated by state and county personnel at between five and six thousand rabbits. This method of control, used in San Bernardino County in the Victorville area, achieved kills reported as satisfactory. In southeastern Mono County, an extensive series of plots begun three years ago has continued with the cooperation of the William Symons ranch. Although some encouraging kills were obtained, these could not be duplicated. Several trials of the damp barley prebait method, although prebait was well taken, failed to produce the satisfactory kills obtained in the Mojave area, Kern County. It is expected more time will be devoted to the problem in the ensuing year.

Muskrats

During the past year investigations concerned with muskrat control techniques have continued, in cooperation with the University of California at Davis; certain counties and irrigation districts aided financially. The need for development of toxic baits had been recognized but held in abeyance until other phases of control had been reviewed. Since it was expected that the matter of selective exposure of lethal baits for the control of muskrats would provide unusual problems, it was decided to get this phase under way as quickly as possible.

The problem of selective exposure of test materials was finally solved with the use of floating bait boxes covered and anchored close to cattails or tules and always at least a few feet offshore. The floating boxes, which in effect are just another object to climb upon or into, were readily accepted by the muskrats and do not appear to have been used by other wild life. Initial test work was begun at the Joice Island Fish and Game Refuge, Solano County. Later a much greater population was discovered at an isolated waterway near Locke in Sacramento County, and work was transferred to this location. In the succeeding several months many kinds of untreated bait were exposed in the boxes, and nearly all was readily accepted. Among the materials accepted are apple, carrot, pear, sweet potato, banana, celery, sugar beet, corn and rolled wheat, oats and barley. A mixture of grated carrot and gelatin in half-inch cubes was also satisfactory. For the purpose of the above tests the box size was held to that of the original. They are shallow, only seven inches inside depth, 18 inches long and 18 inches wide. The two entrances are purposely shallow, about three and three-fourths inches by 7 inches, diagonally opposed. The most satisfactory pontoon is two pieces of 2" x 12" x 3' which provides a very good platform on which the muskrats like to rest. Cleats are necessary to keep the base of the boxes a little above the pontoon and reasonably dry. The muskrats in accepting the boxes have hauled in quantities of new and old cattail and tule sections. Crayfish claws and shell fragments were also found in boxes. Reports of crayfish being eaten by muskrat was questioned. It was later observed, however, that a caged muskrat quickly ate a crayfish, first severing the large claws at the body, then eating through the back. The same animal repeated on another crayfish several hours later. After learning that quite a number of food items would be acceptable to muskrats, this phase of investigation was dropped and consideration given to lethal dose studies.

The first animals obtained were used to check the effect of zinc phosphide. There were not enough animals to complete the studies, and winter weather conditions made it necessary to discontinue the toxicity studies temporarily. The work will be

resumed as soon as possible next spring; it is hoped that field tests can be made in early summer.

Injurious Bird Species

Depredations from injurious bird species seem to be about normal with severe damage to some crops in certain areas. There has been extensive disbudding of almonds, apricots and various deciduous fruits, mostly by linnets or finches.

Blackbird damage to crops has been on the increase in several districts. Recently they have been responsible for large losses to several crops in the Palo Verde Valley, Riverside County, particularly grains and sorghums. Heavy populations of these birds were seen at various times during the winter months around livestock feeding yards in the valley. The value of the feed consumed in these yards alone amounts to an astonishing figure—from 50,000 to 75,000 birds in a rather small area and present for seven months of the year. These birds are mostly the Sonoran species from Mexico.

Starlings. No unusual activity on the part of these winter migrants was noted during the past year. With the exception of a flock reported to be more than 1,000 birds, observed near Sacramento in mid-January, no other large numbers were seen. Small flocks were noted at different locations in the Sacramento Valley and the points of previous observation in Lassen and Siskiyou Counties. Although we expected to find a longer residence in Siskiyou County, the birds had migrated north by early April, as in other areas.

The fall migration to California was not particularly heavy as far as we know, and no large numbers were reported in the Sacramento Valley.

PREDATORY ANIMAL CONTROL

H. NELSON ELLIOTT, *District Agent*

Predatory animal control for the protection of livestock, poultry, certain crops such as grapes, melons and dates, valuable game species and for the suppression of rabies was conducted under the joint program of the California Department of Agriculture and the United States Fish and Wildlife Service, in cooperation with 34 counties and the Tehama Predator Association. Kings County discontinued participation in the cooperative program during July.

The California Woolgrowers Association, officials of the United States Forest Service, Bureau of Land Management, State Department of Fish and Game, county agricultural commissioners and farm advisors contributed valuable assistance to the program.

CHART NO. 2

Total Funds Available for Work During Calendar Year 1954

Agency	Total
State of California.....	\$194,669
Federal.....	44,486
Counties.....	176,121
Association.....	15,600
Total.....	\$430,876

CHART NO. 3

Predators Taken

Hunters paid by	Bear	Bobcat	Coyote	Mountain Lion	Total
State of California.....	11	1,544	3,600	3	5,158
Federal.....	4	19	41		64
Counties.....	75	1,393	2,791	7	4,266
Association.....	1	98	263		362
Totals.....	91	3,054	6,695	10	9,850

CHART NO. 4

Funds Appropriated by Cooperating Counties Effective July 1, 1954,
for the Fiscal Year Ending June 30, 1955

County	Amount	County	Amount
Alameda.....	\$4,680	San Diego.....	\$4,416
Amador.....	3,300	San Joaquin.....	4,200
Butte.....	8,232	San Mateo.....	4,584
Calaveras.....	4,380	Santa Barbara.....	4,416
Contra Costa.....	4,692	Santa Cruz.....	2,040
Del Norte.....	930	Santa Clara.....	4,116
El Dorado.....	4,512	Shasta.....	8,876
Humboldt.....	19,100	Solano.....	13,120
Imperial.....	3,300	Sonoma.....	9,120
Kern.....	9,113	Stanislaus.....	23,000
Kings.....	269	Tulare.....	3,924
Lake.....	4,977	Tuolumne.....	4,476
Lassen.....	5,580	Yolo.....	8,348
Los Angeles.....	4,910		
Madera.....	4,470	Total.....	\$176,741
Mariposa.....	2,040		
Merced.....	3,860	In addition the following funds were made available:	
Modoc.....	4,536	Tehama County Predator Associa- tion.....	15,600
Napa.....	8,064		
Nevada.....	3,360	Grand total.....	\$192,341
Placer.....	3,840		
Sacramento.....	3,960		

¹ In addition pays mileage of hunter.

² Also furnishes car for hunter use.

In addition to coyotes, bobcats, bears and lions, there continued to be numerous instances where special effort was required to control raccoons, fox, skunk and opossum to protect poultry and crops. Special effort was also directed toward control of smaller animals relevant to rabies suppression in some sections, principally Tulare, Napa, Lake, Ventura and Santa Barbara Counties. One fatal case of the dreaded disease occurred in Tulare County. A woman was bitten by a civet cat while camping at Sugar Loaf Mountain, Tulare County, and contracted the disease; she passed away December 4.

Losses occasioned by predators were variable during the year. The most severe losses by coyotes occurred in Mariposa and Solano Counties where individual animals destroyed unusual numbers of sheep on several ranches. Coyote losses of from one to five sheep were also reported from Placer, El Dorado, Amador and Sonoma Counties. Calves were also reported killed by coyotes in Calaveras, Tulare and Orange Counties.

Mountain lions killed an unusual number of sheep in Mono County.

Bears were responsible for the usual trouble experienced by Humboldt County stockmen; however, sheep loss to bears did not occur on summer ranges in the Sierra Nevada counties.

During the year supervisory personnel met with woolgrowers associations throughout the State. Discussions on control operations with stockmen made it apparent that losses were held to a minimum generally and to a complete absence in many sections.

Although record numbers of lambs were on feed in Imperial Valley and hunters there eliminated larger than usual numbers of both coyotes and bobcats, there were no stock losses reported.

Based on numbers of animals taken, the coyote and bobcat population of the State would appear to be holding its own. However, by far the greatest numbers occur in Southern California. At present San Diego, Orange and Riverside Counties are perhaps the most heavily infested. San Diego County has been participating in the work for several years with an effective program in cooperation with the agricultural commissioner. Part-time services of state-paid hunters do not, however, adequately provide needed control in Riverside and Orange Counties.

Hunters in Modoc, Lassen and eastern Siskiyou Counties cooperated with the State Department of Fish and Game's study of antelope-coyote relationships by adjusting their trap lines to avoid certain study areas and saving stomach contents of coyotes caught in other traps. Mr. Hjersman, Fish and Game Biologist in charge

of the project, informed us of the most unusual item recovered from the stomach of a Devil's Garden coyote, a human fingernail. Man-killing coyote or missing deer hunter? Coyote numbers are comparatively low in this region; preliminary results of this coyote study, we are told, show they are not a limiting factor in antelope populations here, although they certainly must have been some years ago. California's northeastern antelope herds are at a serious reproduction standstill.

The use of steel traps continued to be the principal method of eliminating predators, although the judicious use of lethal baits and coyote getters were important factors in preventing greater losses to coyotes.

SEED INSPECTION

EMRO C. BRUCH, *Field Supervisor of Seed Inspection*

The seed inspection service of the bureau is concerned with supervising the enforcement of the California Seed Law, Seed Screenings Regulations, regulatory phases of seed certification, investigations and operating and maintaining the State Seed Laboratories. These functions include supervision of the regulatory work in the field and informing the seed trade and buying public of provisions of the Agricultural Code pertaining to seed inspection and testing of seed in the seed laboratories.

The bureau was represented on the California Seed Council by the chief, the field supervisor of seed inspection, supervising seed analyst and a seed analyst, grade II. The bureau was also represented at the in-service training program of the department by the field supervisor of seed inspection. The bureau chief served as president of the California Crop Improvement Association.

Regulatory Phases of Seed Inspection

Ten meetings were held to promote a more uniform enforcement program with county agricultural commissioners' staffs, for instruction in processing, sampling and inspection of agricultural and vegetable seeds. These meetings, at which 152 county personnel attended, proved beneficial in obtaining more uniform enforcement.

The year evidenced the first full 12-month period of a state seed inspector coordinating and supervising the seed inspection activities of the northern 16 coastal counties. This additional assistance was well received by county agricultural commissioners and their staffs and was doubly welcome for the new field man in this district was an experienced seed analyst from our Sacramento laboratory. An illustration of the increased interest was manifested by an increase of 87 percent in the number of official samples from the district.

The seed inspection program in Southern California has progressed under the effective supervision of the senior seed inspector, Los Angeles office. Numerous meetings were held with county personnel to promote uniformity in the seed inspection program. Two hearings were held on suspected violations of the California Seed Law.

The effective supervision and coordination of the senior seed inspector in charge of the regulatory phases of the seed certification program has done much to further a uniform and adequate state-wide enforcement in this very necessary function of a growing California seed industry.

The county agricultural commissioners and their staffs almost without exception have given excellent cooperation in enforcement of regulatory phases of the seed certification program, which produces seed of known genetic identity and purity and with a high standard of viability.

Although certification samples submitted to the Seed Laboratory decreased approximately 31 percent under 1953, the total acreage of certified seed decreased only 1 percent in the same period of time. The largest single reduction for any one crop was in Ladino clover, reduced by 9,770 acres or 46 percent of 1953 acreage. The acreage of certified beans was also down about 1,876 acres or 15 percent. These reductions were partly compensated by an increase in certified alfalfa seed acreage of 6,908 acres or 9 percent. There was also a small increase in the acreage of certified sorghums, flax, cereals and rice.

Cooperation with the Bureau of Plant Quarantine, in relation to the enforcement of quarantine measures on noxious weed seed infested grains, has been maintained. At times, this activity has required considerable attention when local conditions and warehousemen tended to jeopardize effective regulation of infested materials.

During the year 783 official samples were drawn, an increase of 55 percent over 1953. The samples represented 491 lots of agricultural seed and 292 lots of vegetable seed submitted by agricultural commissioners of the following counties:

Los Angeles	298	Santa Barbara	9
Riverside	143	Monterey	8
San Francisco	46	Butte	5
Orange	29	Sacramento	5
Stanislaus	24	San Luis Obispo	4
Kern	22	Modoc	3
Fresno	21	Sutter	3
Santa Cruz	21	Lassen	2
Solano	20	Ventura	2
San Diego	15	Colusa	1
San Mateo	15	Del Norte	1
Santa Clara	15	El Dorado	1
Imperial	13	Lake	1
San Bernardino	12	Marin	1
Humboldt	11	Merced	1
San Joaquin	10	Siskiyou	1
Alameda	9	Tulare	1
Napa	9	Yolo	1

Twenty-six agricultural commissioners submitted no official samples. One hundred ninety-seven or 40 percent of the lots of agricultural seed sampled were in violation of the California Seed Law in the following respects:

<i>Mislabeled as to</i>	<i>Instances</i>	<i>Not labeled as to</i>	<i>Instances</i>
Purity	60	Germination	27
Germination	52	Name of seed	26
Inert matter	45	Purity	24
Other crop seed	42	Inert matter	22
Weed seed	13	Other crop seed	20
Name of seed	12	Weed seed	16
Other statements	7	Lot identification	16
Sum of germination and hard seed percentages	4	Date of germination	13
Having "firm seed"	2	Secondary noxious weed seed	7
		Treated seed in red letters	4

Thirty-nine or 13 percent of the lots of vegetable seed sampled were in violation of the California Seed Law in the following respects:

Mislabeled as to germination	7 instances
Not labeled as to date of germination	28 instances
"Below standard"	26 instances
Germination	25 instances
Date of germination or shipment	3 instances
Variety	1 instance

There were 1,525 "stop-sale" orders issued, an increase of 14 percent during 1954. "Stop-sale" orders were issued for the following violations:

Germination test outdated	1,040 instances
Incompletely labeled	171 instances
Mislabeled	73 instances
Unlabeled	137 instances
Date of shipment outdated	86 instances
Treated seed without appropriate warning	3 instances
Altered label	5 instances
Not legibly labeled	1 instance
Containing primary noxious weed seed	1 instance
Not properly certified	8 instances

The number of "stop-sale" orders issued for germination tests being outdated remained high, in spite of the fact this was the first full year of a 12-month date of test period instead of a 9-month period. Increased activity on the part of the county personnel, especially in the northern and central coastal counties, appears to be the reason for the increase.

California Crop Improvement Association Trust Fund

The Director of Agriculture and the California Crop Improvement Association have continued an agreement whereby the association would provide funds for the department to employ a senior seed inspector in supervising the regulatory phase of



Top left, reading down: Covered bait box showing vegetation taken to box by muskrats. Opened muskrat bait box showing vegetation and crayfish claws and shell fragments—Spraying camelthorn in Afton Canyon in San Bernardino County. Top right, reading down: Rat damage to growing corn (Courtesy Santa Clara County Department of Agriculture)—Spraying Halcyon on the county-state project in Lassen County—Setting crayfish traps in Santa Barbara County—A dense infestation of camelthorn along the Mojave River in Afton Canyon.

the seed certification program, which is performed by the various county agricultural commissioners. The trust fund also provides for a seed analyst, grade 1, who has been assigned to the branch laboratory equipped by the association at Davis.

Federal-State Seed Laboratory

The Sacramento laboratory experienced the busiest year on record. Personnel of the laboratory efficiently and effectively performed their duties under this heaviest work load. The increase of the number of samples in the last four months of the year was very pronounced, caused by a heavy load of governmental service and regular service testing in addition to an increase in the number of alfalfa seed samples. No experienced additional help was available, and the personnel and equipment of the laboratory was taxed to the limit.

The supervising seed analyst represented the bureau at the annual meeting of the Official Seed Analysts of North America, held at Ames, Iowa.

A seed analyst, grade 1, was added to the Los Angeles laboratory staff to replace a seasonal agricultural inspector in the work of examining quarantine samples for noxious weed seeds.

Cooperation with the Federal Government in testing federal samples and enforcement of the Federal Seed Act was maintained as in previous years. There were 479 samples of imported seed requiring 924 tests. State and county personnel reported 32 lots of seed suspected of being in violation of the Federal Seed Act. Samples taken from these lots required 68 tests. Two suspected violations were found to be within tolerance; 15 letters of warning involving 19 lots of seed were issued by federal authorities; prosecution by federal authorities is underway against two firms involving three lots of seed; action by federal authorities is pending against seven firms involving nine lots. Five hundred eighty-eight other federal samples required 1,058 tests.

Fees amounting to \$31,944.50 were collected on 7,029 service and certification samples on which 3,080 purity tests, 6,754 germination tests and 500 noxious weed seed examinations were made.

A decrease of 15 percent in the total revenue was due to a decrease of 31 percent of samples and subsequent loss of 30 percent or \$9,093 of revenue from the California Crop Improvement Association. An increase of 46 percent of the numbers of service samples brought an additional \$3,477 or 36 percent gain from that source. Investigational and quarantine samples remained at approximately the same number as the previous year.

The following table summarizes the work of the seed laboratories for 1954:

CHART NO. 5

	Number of samples	Purity	Germina- tion	Identifica- tion	Noxious weed exam	Total
Sacramento Laboratory:						
Official (Calif. Seed Law):						
Agricultural seed	491	486	487	0	4	977
Vegetable seed	292	3	292	0	0	295
Service Samples	3,889	454	3,818	12	364	4,648
Calif. Crop Improvement Assn.	3,140	2,626	2,946	1	136	5,709
Investigational Samples	371	6	368	1	1	376
Quarantine Samples:						
Bureau of Plant Quarantine	250	0	0	0	250	250
Agricultural Commissioners	489	0	0	84	403	487
Total for Sacramento Laboratory	8,922	3,575	7,911	98	1,158	12,742
Los Angeles Laboratory*						
Quarantine Samples:						
Bureau of Plant Quarantine	0	0	0	0	0	0
Agricultural Commissioners	2,710	0	0	25	2,685	2,710
Service Samples	12	0	0	12	0	12
Total for Los Angeles Laboratory	2,722	0	0	37	2,685	2,722
Grand totals	11,644	3,575	7,911	135	3,843	15,464

* Identifications and noxious weed-seed examinations are the only seed tests made at this laboratory.

The Sacramento and Los Angeles laboratories examined 3,449 quarantine samples for noxious weed seeds. The Sacramento laboratory examined 250 samples for the Bureau of Plant Quarantine and 493 for county agricultural commissioners; one of the former and 26 of the latter were infested with noxious weed seed.

The Los Angeles laboratory examined 2,710 samples for the agricultural commissioners of the 10 southern counties; 1,232 of these samples were infested with noxious weed seed.

The following table shows the number of times primary and secondary noxious weed seeds were found:

	SACRAMENTO LABORATORY		LOS ANGELES LABORATORY	
	<i>Agricultural Commissioners</i>	<i>Bureau of Plant Quarantine</i>	<i>Agricultural Commissioners</i>	<i>Total</i>
<i>Noxious Weed Seed</i>				
Primary :				
Canada thistle -----	6	--	488	494
Carolina horsenettle -----	1	--	--	1
Creeping sowthistle -----	--	--	48	48
Perennial sowthistle -----	--	--	--	--
Gaura -----	--	--	--	--
Hoary cress -----	3	--	36	39
Quackgrass -----	7	1	678	686
Russian knapweed -----	2	--	15	17
Texas blueweed -----	--	--	8	8
White horsenettle -----	4	--	18	22
Klamath weed -----	1	--	4	5
Leafy spurge -----	--	--	--	--
Total -----	24	1	1,295	1,320
Secondary :				
Alkali mallow -----	--	--	4	4
Bermuda grass -----	--	--	74	74
Dodder, Big-seed alfalfa -----	--	--	137	137
Dodder, Clover -----	--	--	--	--
Yellow star thistle -----	3	--	8	11
Field Dodder -----	3	--	29	32
Puncture vine -----	--	--	1	1
Flax, Dodder -----	--	--	1	1
Dodder, Little seed alfalfa -----	--	--	--	--
Johnson grass -----	2	--	60	62
Poverty weed -----	3	--	53	56
Sandbur -----	--	--	63	63
Wild morning glory -----	5	--	44	49
Dodder, Chilean -----	--	--	--	--
Total -----	16	0	474	490

BUREAU OF CHEMISTRY

The Bureau of Chemistry administers five portions of the Agricultural Code pertaining to:

1. The registration, labeling, and sale of fertilizing materials,
2. The registration, labeling, and sale of pesticides,
3. The use and application of injurious materials,
4. Deleterious pesticide residues on produce, and
5. Regulation of the agricultural pest control business.

Instead of presenting the annual report of the bureau under these five headings as done in previous years, the present report provides a broader picture of the bureau's activities concerning various types of agricultural chemicals by describing the work under the general administrative headings of registration, licenses, and permits; inspections, sampling, and analysis; and warnings and prosecutions. In addition, one section describes accidents and injuries involving agricultural chemicals and another presents data on amounts of these materials used in California.

REGISTRATION, LICENSES, AND PERMITS

The law requires appropriate registration (on a fiscal year basis) to be secured before offering for sale in California any:

1. *Pesticide* (or "economic poison"), which includes insecticides, fungicides, herbicides, vermicides, defoliants, disinfectants, repellents, wood preservatives, and substances for control of internal and external parasites of livestock, snails, predatory animals, algae, and other materials for control of pests.

2. *Commercial fertilizer*, which is fertilizing material containing 5 percent or more of nitrogen, available phosphoric acid, and water-soluble potash, singly or collectively;

3. *Agricultural mineral*, which is fertilizing material containing mineral substances and less than 5 percent of these plant foods; and

4. *Auxiliary plant chemical*, which includes hormones for promoting rootings of cuttings, materials for reducing preharvest drop of fruit, bacterial inoculants for legumes, and similar products.

No registration is required of manures or soil amendments, which include such materials as peat, leafmold, and potting mixtures. No further registration is required for a dealer to resell any agricultural chemicals in original packages filled and labeled by a registrant.

The law requires an appropriate license or certificate (on a calendar year basis) to be secured before engaging in certain types of business:

1. *Fertilizer salesmen*. A license must be secured to sell any commercial fertilizer, agricultural mineral, or manure except that no license is required to sell such substances in packaged form only, from a fixed place of business, if no sales are solicited outside such place of business. The fee is \$2 for a calendar year. No examination is required.

2. *Agricultural pest control operator*. A license must be secured to engage for hire in the business of agricultural pest control. The fee is \$15 for a calendar year. The applicant must pass an examination covering the proposed scope of his work, and the license shows the specific types of agricultural pest control work which the operator is authorized to conduct.

3. *Agricultural aircraft pilot*. A certificate of qualification or an apprentice certificate must be secured to operate any aircraft in the business of pest control. The initial fee is \$25 and the renewal fee is \$5 for a calendar year. A written examination covers the types of work for which the pilot wants to be qualified.

4. *Apprentice pilot*. An apprentice certificate permits such operation under the direct and personal supervision of a person holding a certificate of qualification. The fees are the same as those for the regular pilot and a written examination covers the types of work for which he wants to be qualified.

TABLE 1
Firms and Persons Registered on Fiscal Year Basis

	1949-50	1950-51	1951-52	1952-53	1953-54
Fertilizing Materials					
Commercial fertilizers.....	226	243	237	269	305
Agricultural minerals.....	167	162	149	163	180
Auxiliary plant chemicals.....	26	29	26	26	28
Fertilizer jobbers.....	8	8	8	10	12
Pesticides					
General licenses.....	765	757	740	854	875
Household licenses.....	62	56	47	45	36
Use-sale licenses.....	51	45	46	43	36
Total pesticide firms.....	878	858	833	942	947

In lieu of an agricultural pest control license, the law permits issuance of a free permit to:

1. *Tree surgeons* who perform certain restricted pest control operations incidental to their business of tree surgery, and

2. *Farmers* and other persons who are not regularly engaged in the business of pest control and who operate only in the vicinity of their own property and for the accommodation of their neighbors.

A permit must be secured from the county agricultural commissioner before using:

1. Herbicidal preparations containing 2,4-D, 2,4,5-T, or MCP (certain exceptions are made for use of small amounts in certain areas);

2. Calcium arsenate, standard lead arsenate, or copper acetoarsenite when applied in dust form by machine-powered equipment;

3. TEPP when applied in unconfined space as a thermal aerosol;

4. Parathion; 5. EPN; 6. OMPA; and 7. "Systox."

Several public hearings were held during the year to consider proposed changes in regulations governing use of 2,4-D and other injurious herbicides. Some changes were made in the boundaries of the hazardous area, provision was made for certain limited applications within the northern border of the hazardous area near the boundary between Sacramento and San Joaquin Counties, and detailed regulations were adopted governing nozzle sizes, wind velocities, distances from susceptible crops, and other factors involved in limiting drift of these chemicals onto susceptible crops on properties other than those being treated.

The law forbids the sale or possession of thallium compounds, except in ant poisons containing not more than 1 percent thallium expressed as metallic. It also forbids the sale or possession of sodium fluoroacetate, except licensed structural pest control operators may possess it for use in their business. Both materials may be used by federal, state, county, or municipal officers, and certain exemptions are made for nonpesticidal uses. Detailed regulations governing the handling and use of sodium fluoroacetate were drafted during the year, and they were adopted after a public hearing was held to permit interested persons to submit comments and suggestions.

The registrations issued on a fiscal year basis are shown in Table 1. Those on a calendar year basis are shown in Table 2. The increasing numbers of persons and firms so engaged reflect the growth and development shown in the field of agricultural and related chemicals.

TABLE 2
Firms and Persons Licensed on a Calendar Year Basis

	1950	1951	1952	1953	1954
Fertilizing Materials					
Fertilizer salesmen.....	2,499	2,314	2,419	2,493	2,582
Agricultural pest control					
Pest control operators.....	913	980	1,072	1,102	1,132
Farmer permittees.....	37	76	80	82	73
Tree surgeon permittees.....		2	16	10	9
Agricultural aircraft pilots.....	320	447	455	478	452
Apprentice pilots.....		6	38	49	104

TABLE 3
Numbers of Products Registered

	1949-50	1950-51	1951-52	1952-53	1953-54
Commercial fertilizer brands.....	269	282	304	329	356
Commercial fertilizer brand names.....	381	397	404	477	613
Agricultural minerals.....	506	488	486	592	595
Auxiliary plant chemicals.....	115	110	112	111	125
Total fertilizing materials.....	1,271	1,277	1,306	1,509	1,689
Pesticides.....	9,070	9,454	9,773	10,843	11,368
Total products.....	10,341	10,731	11,079	12,352	13,057

The law not only requires a person or firm to secure registration before selling any commercial fertilizer, agricultural mineral, auxiliary plant chemical, or pesticide under his name in California, but each agricultural mineral, each auxiliary plant chemical, and each pesticide must be registered before being offered for sale. Also, each commercial fertilizer offered for sale under a brand name must be registered, but if commercial fertilizers are sold under a brand, the law requires only that the brand be registered without listing each mixture to be sold under the brand. The numbers of various types of products registered are shown in Table 3.

Different registration fees for pesticides became effective for the fiscal year beginning July 1, 1954. Formerly a fee of \$50 permitted registration of ten products, and a fee of \$2 was charged for each additional product. The new fees are \$75 and \$3 respectively. Formerly the law made provision for restricted registration at lower fees of products intended for household use or for use in pest control service work. Now the law provides for a limited registration for \$15 permitting sale of two pesticides with a total retail value of not more than \$500 per annum. The change in fees appeared to have no effect on the numbers of pesticides registered.

INSPECTION, SAMPLING, AND ANALYSIS

Samples of agricultural chemicals are drawn by inspectors from materials found in the channels of trade and sent to the laboratory in Sacramento for examination. Fertilizing materials and pesticides are analyzed to determine conformity with the guaranteed analysis shown on the labeling or, as in the case of manures and soil amendments which the law does not require to be labeled with a guaranteed analysis, analysis is made to provide information to users concerning the composition of the materials. These samples may be drawn from materials still in the hands of a registrant, or in dealers' stocks, or from unopened containers of materials in the hands of a purchaser.

As shown in Table 4, the number of samples has increased somewhat during the past five years to keep up with the increased numbers of products and the increased volume of products being marketed. This shows the actual number of samples analyzed during the calendar years and the figures differ from those shown in the

TABLE 4
Samples Analyzed

	1950	1951	1952	1953	1954
Commercial fertilizers.....	2,392	2,508	2,436	3,229	2,877
Agricultural minerals.....	282	388	558	493	392
Manures.....	13	30	16	13	33
Auxiliary plant chemicals.....	3	1	1	13	10
Soil amendments.....	7	9	27	15	16
Total fertilizing materials.....	2,697	2,936	3,038	3,763	3,328
Pesticides.....	1,952	1,929	1,784	1,964	2,028
Spray residue.....	3,017	3,242	3,413	3,437	3,502
Miscellaneous.....	382	412	381	367	463
Totals.....	8,048	8,519	8,616	9,531	9,321

TABLE 5
Percent of Samples Deficient

	1950	1951	1952	1953	1954
Commercial fertilizers.....	14.1	13.4	14.7	12.7	13.1
Agricultural minerals.....	18.4	19.9	18.2	16.5	13.6
Pesticides.....	10.8	12.5	10.7	10.4	10.6

annual special publications inasmuch as the publication for pesticides covers samples reported during fiscal years and the publication on fertilizing materials covers samples reported, as contrasted to those analyzed, during the calendar years.

Reports on official samples are sent to the registrant or other firm involved and to any dealer or purchaser concerned with the particular lot represented. Deficiencies or irregularities found in the lot examined are discussed with the responsible firm. Seriously deficient materials still in the channels of trade when the report is made are usually withdrawn for reformulation. When deficiencies are found in commercial fertilizers or agricultural minerals, the registrant usually makes a refund of a proportionate amount of the sales price to the purchaser. Table 5 shows the percentage of samples found to be deficient in recent years. The shortages rarely indicate any deliberate fraud. Most of them represent a normal variation to be expected in commercial processes. Many of the deficiencies in mixed fertilizers are caused by segregation of the variously-sized components during bagging or shipping so some portions of the material are below and others are above the guaranteed percentage of individual plant foods.

Reports on analysis of official samples of pesticides frequently assist manufacturers in detecting and correcting improper formulations. Repeated deficiencies in mixed dusts containing "Aramite" showed that certain mixtures were unstable and suitable steps were taken to stabilize them. Parathion in mixtures with copper compounds was found to be particularly prone to decomposition. Some manufacturers ceased making such mixtures and others restricted manufacture to batches made for prompt delivery and use. Sodium hypochlorite solutions with high initial concentrations were found to decompose rapidly as mentioned elsewhere in this report. Some TEPP dusts drop below their guaranteed percentage within a day or two and are obviously not suitable for ordinary dealer distribution.

In collaboration with the Association of Official Agricultural Chemists, an investigation was made of techniques used in sampling mixed commercial fertilizers. For many years, the trierfuls drawn from various sacks in a pile were combined and thoroughly mixed by rolling the material into a symmetrical pile on a rubber sheet. The pile was then quartered and opposite quarters were placed together into a quart fruit jar. One jar was left with the person in charge of the material at the time of sampling and one was sent to the laboratory for analysis. Investigation showed that some heterogeneous materials were difficult to mix and quarter accurately in the field and that there were significant differences between the percentages of plant foods found in the two portions. At the end of the year a public hearing was scheduled to consider proposed revisions of the official methods of sampling fertilizing materials to permit shipment to the laboratory of the entire trierfuls where the material could be ground and mixed more thoroughly to provide a more representative subsample for analysis.

In another investigation of sampling procedure, one bag of a particularly heterogeneous 8-10-12 mixed commercial fertilizer was sampled 20 times with a trier and each trierful was kept separate. The remaining portion of the bag was successively split with a sample splitter or riffle to a three-ounce portion. Then all portions were separately sieved into four particle sizes and the weight of each fraction in each sample was determined. The data indicated that the trier withdrew 1.5 percent to 3 percent by weight less of the large particles and 1 percent to 4 percent more of the fine particles. It seems likely that large particles are preferentially wiped off the surface of the material in the slot of the trier as the trier is withdrawn from the bag. Thus the withdrawn portion might differ from the material in the bag if it is a mixture of greatly different particle sizes with different plant food contents. The modern mixed fertilizer industry is showing a marked trend toward pelletizing mixtures to minimize segregation of components during bagging, shipment, and handling.

TABLE 6

Samples of Fruits and Vegetables Over-tolerance

	1950	1951	1952	1953	1954
Samples analyzed.....	3,017	3,242	3,413	3,437	3,244
Samples over-tolerance.....	103	70	65	60	104
Percentage over-tolerance.....	3.4	2.2	1.9	1.7	3.2

A special survey was made during the year of sodium hypochlorite sanitizing solutions. Approximately one-third of the solutions guaranteed to contain 5.00 percent or 5.25 percent, and nearly all those guaranteed 16 percent, were found to be deficient. Repeated analysis of the solutions after various lengths of time demonstrated that the solutions, and particularly those guaranteed to contain 16 percent, rapidly deteriorate and their short shelf-life warrants special attention in marketing to avoid significant deficiencies. A deficiency in an insecticide or certain other types of pesticide becomes readily apparent to the user who sees that the pest is not controlled and suitable corrective measures can be undertaken, but the user of a sanitizing agent usually is unaware of the efficacy of the materials he uses. It is perhaps more important with sanitizing agents than it is with other types of pesticides that their declared quality should be above suspicion.

Samples of produce are drawn from wholesale and retail markets to determine conformity with the spray residue tolerances established in the Agricultural Code. Most of these samples are secured in the wholesale markets in the Los Angeles, San Diego, and San Francisco Bay areas. In former years, the pesticide tolerances applied only to fresh and dried fruits and vegetables, but the 1953 Legislature expanded the scope to include jurisdiction over hay, fodder, or feedstuffs used for feeding livestock and poultry but not commercial feeding stuffs nor other types of food or feed.

Compliance of fruits and vegetables with the legal tolerances for arsenic, lead, fluorine, and DDT is shown in Table 6. The samples were drawn by trained inspectors who visually examined many lots and sampled those that were particularly likely to carry excessive residues, so compliance by all lots is better than represented by these figures. Over-tolerance lots were required to be acceptably reconditioned by washing or stripping to remove the excessive residue before they could be sold. Individual cases of over-tolerance fruits and vegetables were investigated to determine what misuse of a pesticide resulted in the violation.

A sampling survey was made of hay in the southern part of the State. Analysis was made of 175 samples drawn from 33 hay markets and of 83 samples drawn from baled and unbaled hay in fields. Most of the material was alfalfa but a few samples represented bean straw or oat straw. Of the 175 samples drawn on the hay markets, 109 contained no chlorinated hydrocarbons, 29 contained trace to 4 ppm. calculated as DDT, 13 contained 4 to 7 ppm., 21 contained more than 7 but less than 15 ppm., and 3 contained more than 30 ppm. Some of these residues were DDT and some were toxaphene.

Toxaphene was extensively used on both seed alfalfa and forage alfalfa for control of lygus bugs, sugar beet worm, and stink bugs. In some areas, larger than usual dosages were applied where growers believed that the insects were showing increased resistance to the pesticide. Seed growers commonly make much heavier applications of pesticides to their crops than do growers of forage crops, intending not to use the crop debris to feed animals, but occasionally crops intended for one purpose are later diverted to another and it is evident that some lots have been marketed with residue loads in excess of those permitted by law. Two series of samples drawn from ranches in August and again in October showed that residues of toxaphene on growing alfalfa did not lessen as rapidly as some growers had believed. Some growers will have to reconsider the timing of the dusting programs that they have been following.

Over-tolerance amounts of DDT were found on celery, cabbage, cauliflower, lettuce, and on spinach and similar greens. No over-tolerance amounts of lead, arsenic trioxide, or fluorine were found and only four samples out of 313 contained even a trace. Toxaphene residues in excess of 7 ppm. were found on 41 samples of cauliflower, cabbage, and lettuce, indicating an increased use and increased residues of this chemical as compared with former years. A total of 122 samples were analyzed for parathion, of which 14 contained a trace to 2 ppm. and one contained over

2 ppm. A total of 20 samples were analyzed for captan, 18 showed less than 4 ppm., one showed 7 ppm., and one 15 ppm. No high residues of BHC were found, but 4 out of 22 questioned samples were suspected of having an off-flavor characteristic of this chemical. Some tests were made for malathion on samples of produce known to have been treated, but no significant residues were found.

The rapid and extensive developments in the field of analytical chemistry has increased the frequency with which commercial laboratories and other laboratories call upon the bureau for information on suitable methods for determination of various agricultural chemicals and their residues on treated crops. Methods for many of the problems facing the analytical chemist are not yet published in readily available technical journals but circulate among the scientists in letter or manuscript form pending further work on their accuracy and adaptability for various mixtures.

Approximately 88 gallons of standardized sodium hydroxide titrating solution and standardizing hydrochloric acid solution were supplied to county agricultural commissioners and the Bureau of Fruit and Vegetable Standardization for use in testing citrus fruits and grapes to determine conformity to maturity standards. Checking solutions used for this purpose during the year emphasized the importance of handling them carefully to avoid deterioration. Six "user's samples" were analyzed upon payment of the required fee by the interested person as permitted by law. Approximately 433 "information samples" of various kinds were analyzed in collaborative work with other officials in their work. Included were 107 for county agricultural commissioners, 195 for other bureaus of the Department of Agriculture and others for various federal, state and county offices.

Two chemists in the laboratory served as associate referees in the Association of Official Agricultural Chemists in investigative work in the analysis of rodenticides and of soil amendments. In addition, chemists did collaborative work in the association on determination of nitrogen, phosphoric acid, boron, and inert fillers in commercial fertilizers and determination of gamma isomer of benzene hexachloride in pesticides.

Several chemists from manufacturing firms and one chemist from the control office of another state spent some time in the laboratory becoming acquainted with analytical procedures developed for examination of some of the newer agricultural chemicals.

The bioassay laboratory continued to provide means of examining products for which purely chemical and physical methods are not yet adequate and served well in conjunction with the chemical laboratory in development of analytical techniques. *White rats* were used to determine the potency of red squill, for which no chemical test has ever proven satisfactory, and in some examination of grains and fodder suspected of containing unknown poisons. *Houseflies* were used in dip tests to quantitatively determine components containing mixed chlorinated hydrocarbon insecticides difficult to isolate by chemical means. Some preliminary work was done to see if they could be used in feeding tests to detect a broad spectrum of possible contaminants in produce intended for feed or food. Two studies made of natural mortality in the cultures, one in spring and one in fall, indicated that flies less than eight days old are most suitable for use in dip tests. In some work on *honeybees*, interfering substances were most effectively removed from extracts to be used in dip tests by chilling the extract to remove wax and then chromatographing through two inches of attaclay. It was found that plant pigments could be removed satisfactorily by shaking the extract with attaclay and filtering, and excess lipides could be removed by partitioning between N-hexane and N,N-dimethylformamide. Cockroaches, confused flour beetles, and guppies were also used in bioassays, and traces of 2,4-D were bioassayed by the response of cucumber seeds.

WARNINGS AND PROSECUTIONS

Most violations of law are readily handled by informing the responsible persons of the requirements of law. Some circumstances warrant more formal action such as delivery of written warning notice, holding an investigative interview, quarantine of materials, conducting an administrative hearing on proposed punitive action, citations for an interview with the district attorney and, where necessary to secure compliance, filing criminal complaint. Some of the actions taken during the year are discussed in this sequence.

Misrepresentation of fertilizing materials occurs infrequently and can usually be corrected by direct discussion with the responsible persons, but particular difficulty was encountered during the year with national newspaper and radio advertising of

two garden fertilizers, a product for propagation of plant cuttings, a fertilizer containing alunite, and a volcanic scoria marketed for soil use. Representatives of eastern firms spent time in the Sacramento office discussing the claims and statements being made in their advertising. They frankly stated that they wanted to make claims just short of the extravagance or falsity that would warrant filing criminal complaints, and they indicated that clearance of the text with California would help clear it in other states. There is sometimes a thin distinction between legitimate trade puffing and outright misrepresentation. Correction of an advertisement word-by-word and phrase-by-phrase may serve to eliminate direct misstatements and still leave a text that creates a false impression in the average reader's mind.

Warning notices are used where the degree of noncompliance observed warrants something more than a mere oral warning and something less than a quarantine of material or prosecution. The offense observed and the correction necessary is briefly described in writing on an official form and handed to the interested person, making the warning a matter of written record. This has been found to be effective in correcting minor violations most effectively and economically. For example, written notices of warning were issued to:

The driver of a truck and trailer load of petroleum oil for weed control for delivering unlabeled pesticide. Several previous attempts were made to intercept similar loads suspected to be unlabeled, but the deliveries were always made several hours earlier than promised.

A nursery owner who exposed for sale improperly labeled agricultural lime at the nursery and displayed it at a county fair. The packages did not state the name and correct percentage of each ingredient of agricultural value claimed for it.

A delinquent agricultural minerals registrant who in an indefinite way first said that he had lime-sulphur solution for soil application, but changed his story to say that he was using it on his own land.

A dealer who offered for sale an unstable disinfectant by subpackaging from the original container into smaller containers without registration and proper labels.

A lumber yard owner who offered creosote for sale by subpackaging out in small containers instead of selling it in the original labeled drum.

An anhydrous ammonia dealer for failing to label every cylinder with a proper label.

A farm supply dealer for selling a wood preservative which was misbranded by the manufacturer because it did not state the name of the active ingredient, zinc naphthenate, but was labeled with the name of a different ingredient, copper naphthenate.

A chain drug store because it displayed for sale a large supply of an unregistered insect repellent which did not state the names of the active ingredients.

A concession-stand salesman at the State Fair who offered for sale packets of lavender herb by claiming it was a moth repellent. The product was not registered or properly labeled as a pesticide.

An agricultural minerals registrant for sale and delivery of unlabeled beet sugar lime for agricultural use.

Two ranchers who applied 2,4-D to their grain crops without securing a permit from the agricultural commissioner.

Two licensed agricultural pest control operators for poor workmanship.

An operator for dusting under unsuitable weather conditions.

An operator for excessive application of oil.

An operator for spraying before securing renewal of license.

An operator for failure to register with the agricultural commissioner.

Two operators for failure to submit reports to the agricultural commissioner when due.

One agricultural commissioner suspended an operator's county registration until delinquent reports were filed; another commissioner suspended a registration temporarily when an operator applied a pesticide for a purpose for which it was not registered.

Investigative interviews are held where the nature of the violation requires detailed discussion with the responsible persons. These are informal meetings but written notes are made of the discussion and the corrective actions that the persons concerned propose to make. The meetings are commonly held in the presence of the county agricultural commissioner if they involve matters of direct interest to him. Such interviews were held with several manufacturers of commercial fertilizers and agricultural minerals to find the reason for their repeated deliveries of deficient materials. Another firm had deliberately shipped unlabeled sacks of an agricultural

mineral. Promoters of a secret and questionable technique for rejuvenating old citrus groves were thoroughly informed of the requirements of law and the penalties for infraction. An interview was held with a firm and one of its salesmen who was recommending application of toxaphene-parathion dusts to cauliflower shortly before harvest, a firm that had sold and applied an unlabeled petroleum hecicide to carrots and damaged the crop, firms that sold unregistered and improperly labeled pesticides, a firm that sold a seriously deficient pine oil disinfectant, growers and salesmen who used parathion without a permit from the commissioner, operators who had failed to register with the commissioner, operators who had failed to submit to him monthly reports of work done as required by the commissioner's regulations, and operators who had allowed damaging drift of pesticides from the field which they were treating.

Quarantine of products is occasionally made when such action is warranted to remove material from channels of trade until compliance with law is had. For example, during the year 1,000 100-pound bags of soil sulphur in possession of a distributor were quarantined when it was found to be inadequately labeled. Furthermore, analysis of an official sample showed that the material contained sulphur 41 percent instead of 45 percent as guaranteed. Quarantine was lifted after the material was properly labeled and registered. Several stocks of three liquid fertilizers in possession of dealers were quarantined until they were properly labeled. A large stock of superphosphate was quarantined when the bags were found to be almost completely disintegrated and with illegible labels. Two stocks of TEPP dust were quarantined in the possession of dealers when the supply was found with an expired guarantee date. In several cases, tanks of weed oil were quarantined when dealers were found to be illegally selling portions of the material to various purchasers. Stocks of unregistered household and garden sprays, agricultural sprays and dusts, copper sulphate and sodium pentachlorophenate were quarantined until proper correction was made to permit sale or until the material was withdrawn from the market.

An *administrative hearing* was held when an agricultural commissioner charged a pilot and pest control operator with operating in a negligent manner when 2,4-D was applied to a field of peas, oats, and vetch without a permit and without receiving permission of the property owner. By mistake, the injurious herbicide was applied to the wrong field. The operator's license and pilot's certificate were suspended for 10 days but the suspension was held in abeyance, to go into effect if any laws or regulations were violated during the year.

Citations to appear in the district attorney's office were issued to a man who was soliciting and billing for agricultural pest control work without having a license; to another who had performed pest control for hire without securing a license; to a nurseryman who had used parathion without securing a permit; and to a salesman who misrepresented agricultural gypsum to contain a greater percentage than that guaranteed by the registrant. In these cases, the district attorney warned the person that repetition of the offense would lead to prosecution.

Criminal complaint was filed against the president of an out-of-state firm who sold several thousand dollars worth of unregistered commercial fertilizer with substantial misrepresentation during a quick tour through the southern part of the State. The warrant for his arrest had not been served by the end of the year. A man who pleaded guilty to selling commercial fertilizer without a salesman's license and to dishonest dealing received a sentence of six months in jail, suspended for two years pending good behavior. A man who had illegal possession of sodium fluoroacetate was found guilty and fined \$20. On charges filed by an agricultural commissioner, a pest control operator and a ranch foreman were found guilty of applying 2,4-D in a hazardous area. They were fined \$200 and \$50 respectively and given jail sentences of 30 days, all of which was suspended for two years pending good behavior. Two agricultural aircraft pilots were fined \$100 each for applying 2,4-D to a rice field when no county registration had been secured and no permit issued for the application as required by regulation. Following the near death of a workman who was hired to apply parathion dust without being warned of the dangers or equipped with suitable respirator and protector clothing, a land owner and a share-cropper were each fined \$250 and 90 days in jail. The jail sentence was suspended one year pending compliance with law. A man who used parathion without securing a permit from the agricultural commissioner was fined \$25. Another man who applied parathion without a permit was given six months in jail, which sentence was suspended for three years on the condition that he not violate any law during that period. A warrant was secured for arrest of a man charged with engaging in agricultural pest

control without a license but he had not been located by the end of the year. On charges filed by the State Department of Public Health, Bureau of Foods and Drugs, a farmer who sold lettuce with excessive spray residue was fined \$25 and given a suspended sentence to jail for 90 days.

ACCIDENTS AND INJURIES

Accidents and injuries involving agricultural chemicals are investigated to see if any violation of law contributed to the mishap. Study of the details of some cases provides suggestions of advisable precautionary labeling or educational measures to avoid such accidents. Accidents investigated during the year are discussed under the following headings: persons, livestock, plants, pets, honeybees, and wildlife.

Persons: Pesticides were involved in the accidental deaths of eight persons in California investigated by the Bureau of Chemistry during 1954. Three of these involved TEPP, two parathion, two arsenic, and one strychnine. Five were small children from one to four years old who found containers of the pesticides in their play and either drank the material or absorbed it through their skin. One was an eight-year-old boy who helped his grandfather apply a parathion dust and absorbed a fatal amount. One was an agricultural aircraft pilot who became covered with TEPP dust in an otherwise minor accident in his aircraft. One was a man who drank an arsenical weed killer apparently thinking that it was wine. Many additional accidents occurred but were not fatal to the victims. The pesticidal chemicals most commonly involved in the accidents during the year were the highly toxic organic phosphates: parathion, TEPP, and "Systox." Bureau of Chemistry Announcement No. PC-57 was issued during the year describing the fatalities and 14 nonfatal accidents involving these chemicals. Insofar as could be determined, the products involved in each one of these accidents was properly registered and adequately labeled according to present requirements. Most accidents involved a complete disregard for the precautionary measures described on the labels and some accidents involved deplorable lack of ordinary personal cleanliness. If the definite value of these pesticides to agriculture are not to be lost in legal restrictions, some way must be found to keep them from irresponsible hands and to educate every user in the proper way in which they should be handled. More reports were received of allergic persons suffering severe bronchitis after handling castor bean meal fertilizer. Several deaths attributed to pesticides in news items were found to have other causes and several other cases of suspected injury to persons by pesticides were investigated and found to be without substantiation. The industry has initiated an educational campaign to impress the public that it:

1. Use pesticides strictly in accordance with the direction, warnings, and cautions shown on the label.
2. Keep all materials away from children, irresponsible persons, and domestic animals.
3. Always keep materials in their original properly labeled containers.
4. Dispose of empty containers properly.

Livestock: As in former years, several reports were received from agricultural commissioners about deaths of livestock from obscure causes, and samples of hay and other forage were analyzed to see if residues of some pesticide might account for the deaths. Occasionally traces of an arsenical or of chlorinated hydrocarbon insecticides were found but rarely during the year was the amount found believed to endanger the health of cattle. On the other hand, residues of DDT, toxaphene, and other chlorinated hydrocarbons were sometimes found, which rendered the hay or forage unfit for feeding dairy animals or livestock being fattened for slaughter. Small amounts of such contaminants, while not endangering the life or development of the livestock, can appear in the milk or the fatty portion of the meat of the animals and constitute a questionable component of these food products.

Plants: There were fewer reports of large-scale injury from 2,4-D during the year than were received in any year since that potent weed killer was first marketed. Approximately 10 acres of a 34-acre cotton field showed symptoms of damage following application of 2,4-D for control of morning glory in a neighboring ranch. Another cotton grower caused severe damage to his own cotton by using 2,4-D to control weeds along ditches on his property. Characteristic symptoms appeared on crops adjacent to an irrigation district ditch that had been treated with the chemical. Sugar beets showed some symptoms after an adjacent field of barley had been treated. Surveys of vineyards in various parts of the State in mid-season showed

TABLE 7

Tonages of Commercial Fertilizers and Agricultural Minerals Used in California

	1950	1951	1952	1953	1954
Commercial fertilizers.....	640,050	736,203	748,321	808,550	833,833
Agricultural minerals.....	411,104	700,356	817,225	714,077	615,992
Totals.....	1,051,154	1,436,559	1,565,546	1,522,627	1,449,825

either no symptoms or occasional traces of effects believed to be of no consequence. A number of cases during the year emphasized the hazard of using for other purposes equipment or containers that once held 2,4-D. Peppers were injured when sprayed by aircraft that had been used for 2,4-D even though the equipment had been carefully cleaned. A field in which several kinds of vegetables were growing showed serious injury when treated with a spray containing a small amount of a spreader which had been placed in a can previously used for 2,4-D. Cypress trees were killed when 2,4-D residues were washed from a spray rig on neighboring property. Drift at time of application accounted for several cases of injury although none were as widespread or on as large a scale as in the previous years. Copper fungicides were blamed for extensive damage to lemon foliage and excessive drop of fruit. Examination of the copper compounds concerned showed that they all conformed to guaranteed analysis. Determination of copper in water-soluble form showed some differences between products but the significance of the findings is obscure. Lime sulphur appeared to injure peach trees when applied in February in the normal manner, but analysis of the material sampled from various containers did not give any explanation for the injury. Drift of cotton defoliant onto potato fields was blamed for widespread top dieback of the potato foliage but examination of the fields by plant pathologists and others indicated that the chemical was not to blame. Mistaken use of arsenic trioxide instead of calcium arsenate dust severely damaged cabbage and watermelon fields. TEPP spray severely spotted pears when it was applied in insufficient water and in too coarse a spray in hot weather. Damage to apple trees from a mixture of lime-sulphur solution and petroleum oil was traced to separation of the oil emulsion in improperly functioning spray equipment. The taste of olives can be greatly impaired by traces of BHC and packers sent circulars to olive growers warning them against the hazards of application or drift of this insecticide.

Pets. Chlordane was again implicated in death of cats, according to a report investigated during the year. The toxicological literature is somewhat contradictory, but use of any of the chlorinated hydrocarbons on cats is of questionable safety.

Honeybees. Fewer reports of injury to honeybees were received during the year than in previous years, indicating that the hazards from pesticides and the means of avoiding them are becoming better known. Severe losses of honeybees in 1953 followed use of dieldrin on citrus trees during the prolonged blooming period. The dangers of application on blossoms were discussed in a number of meetings of growers and given other wide publicity, and no serious losses were reported during 1954. This provides another example of how knowledge of the hazards involved in applying pesticides and adequate education of operators and growers secures han-

TABLE 8

Tons of Plant Foods Used in Commercial Fertilizers in California

	1950	1951	1952	1953	1954
Nitrogen.....	116,650	137,340	139,190	154,360	162,060
Available P_2O_5	51,450	58,840	62,860	62,760	57,760
Available P.....	22,450	25,680	27,430	27,390	25,210
Potash, K_2O	13,020	13,380	13,470	15,230	14,250
Potassium, K.....	10,810	11,110	11,180	12,640	11,830
Total N- P_2O_5 - K_2O	181,120	209,650	215,520	232,350	234,070
Total N-P-K.....	149,910	174,130	177,800	194,390	199,100

TABLE 9

Tons of Liquid Fertilizing Materials Sold in California

	1950	1951	1952	1953	1954
Ammonia solutions.....	9,150	18,436	22,120	35,964	103,755
Liquid mixed fertilizers.....	8,699	13,468	17,770	22,234	21,395
Ammonium nitrate solutions.....	12,756	13,490	11,903	12,850	17,756
Liquid phosphoric acid.....	5,785	9,674	13,718	8,575	8,637
Fish emulsions.....			1,106	850	673
Total liquid commercial fertilizers.....	36,390	55,068	66,617	80,473	152,216
Percentage of total tonnage of commercial fertilizers.....	5.69	7.48	8.90	9.95	18.25
Agricultural mineral lime sulfur solutions.....	4,451	4,325	4,446	3,543	4,864
Sulfuric acid.....	2,964	4,048	5,120	2,775	2,245
Total liquid agricultural minerals.....	7,415	8,373	9,566	6,318	7,109

dling of these agricultural chemicals to the satisfaction of all concerned. Growers and operators have learned that certain pesticides should not be applied to crops while they are in blossom and some beekeepers are marking their apiaries so owners can be readily identified and notified of proposed pest control applications. The bureau prepared three lists of pesticides segregated according to the degree of hazard they present to honeybees. Some materials seem to present no threat to bees, some may be applied when the bees are not actually present at the time of application, and some are so toxic that they should be applied to blossoms which bees may work later on.

AMOUNTS OF AGRICULTURAL CHEMICALS USED

Although the bureau has no direct function in collection of statistics regarding the amounts of various agricultural chemicals used in California, such data are frequently requested by state and federal statisticians, and by organizations and individuals conducting market surveys. Accurate data are available only for commercial fertilizers and agricultural minerals.

Reports by registrants submitted in connection with quarterly tonnage license tax payments show almost constantly increasing tonnages of commercial fertilizers and agricultural minerals as presented in Table 7. Inasmuch as the plant food content of commercial fertilizers is increasing as well as the gross tonnage of these materials, the increase in plant foods being used in California is even more pronounced as shown in Table 8. The plant foods are shown in terms of phosphorus and potassium as well as in terms of phosphorus pentoxide and potassium oxide in view of the growing interest in expression of all plant foods in terms of the elements. These figures represent the tons of plant foods in commercial fertilizers and do not include those used in agricultural minerals, manures, or other fertilizing materials.

Substantial increase in California production of fertilizer nitrogen was made during the year and much interest was shown in the increased marketing of ammonia solutions. Table 9 shows the recent increase in tonnage of liquid fertilizing materials in California.

No data are available to show the tonnages of fertilizing materials used on individual crops, or to show the tonnages used in various counties or agricultural regions

TABLE 10

Audit of Commercial Fertilizers Registrants

	1950	1951	1952	1953	1954
Firms audited.....	109	131	180	177	155
Firms correct.....	44	56	104	103	109
Firms short.....	37	41	47	45	31
Firms over.....	28	34	29	29	15
Tons short.....	18,255	5,659	11,090	9,300	5,677
Tons over.....	6,425	6,289	7,338	6,883	7,662
Net change.....	11,830	—630	3,752	2,417	—1,985

TABLE 11

Audit of Agricultural Minerals Registrants

	1950	1951	1952	1953	1954
Firms audited.....	89	75	104	104	119
Firms correct.....	36	36	62	61	81
Firms short.....	34	29	27	37	26
Firms over.....	19	10	15	6	12
Tons short.....	10,352	6,568	3,292	9,827	16,464
Tons over.....	3,307	1,497	3,432	1,293	5,591
Net change.....	7,045	5,071	—140	8,534	10,873

of the State. With the tonnages reported by various firms and knowledge of the areas in which they sell, it appears that approximately half the tonnage of commercial fertilizers is sold north of Bakersfield.

The records of commercial fertilizer and agricultural mineral registrants are audited to make certain that their quarterly tonnage license tax payments have been correctly submitted. Tables 10 and 11 show the findings for the last five years. Most of the errors uncovered in the audit are caused by misunderstanding the registered status of firms to whom sales have been made. Tonnage license tax payments are not required on sales made to registrants and, unless the registered status of a purchaser is determined at the time of sale, the seller may pay the tax when it is not due or fail to pay the tax when it is due. The larger firms are audited every year and the smaller ones about every two or three years, thus the tonnages in these two tables do not just cover the calendar year in which they were made but each overlaps the preceding two years. The net correction of tonnage has never been large during the past 20 years while audits have been regularly made although the first few years that audit was made it uncovered shortages of approximately one-quarter of the tonnage that had been reported.

No accurate figures are available to show the amount of manure sold in California, but a survey made during the year indicated that approximately 5,000,000 bags of manure are sold each year in the Los Angeles area. This represents 150,000 tons of manure with a retail value of \$3,500,000. No estimates have been made of sales of unbagged manure in the Los Angeles area nor of sales of manure elsewhere in the State.

No figures are available on use of auxiliary plant chemicals nor of soil amendments such as peat.

No accurate figures are available to show the amount of pesticides used in California. Tables 12, 13 and 14 summarize the acreages treated by agricultural pest control operators as reported to the individual county agricultural commissioners and estimated acreages treated by other than pest control operators. These acreages treated by agricultural sprays and dusts do not include usage of home and garden pesticides, livestock pesticides, wood and fabric preservers, termite control, industrial pesticides, and many other pesticide uses.

The acreage treated by aircraft in California has increased 50-fold in 20 years as shown by Table 12. The figure for 1954 represents one-third of the total acreage of cropland in the State. These figures are acre-treatments so three applications on the same 100-acre field, for example, would contribute 300 acres to this table. No data were collected for 1944 and 1945.

Table 13 shows the acreage by county and provides a breakdown by type of application. This summarizes the monthly reports submitted by each agricultural pest control operator to the county agricultural commissioner of each county in which he was licensed. In 1954, the agricultural commissioners were not asked for a detailed segregation of these reports by chemical, by pest, and by crop, as was done in former years, because it had been found to be too time-consuming. For the first time, the commissioners were asked to provide similar acreage data for applications made by ground equipment in addition to the figures for aircraft, and also to make some rough estimate of the acreage treated in their county by persons other than licensed agricultural pest control operators. This last figure was to include agricultural applications and not those made for pest control by gardeners. In addition to acreages treated, as shown in this table, operators reported agricultural pest control on many head of cattle, miles of right-of-way, miles of ditches and levees, pounds of seed, and seed potatoes, as well as fumigation and other treatment of grain bins,

TABLE 12

Total Acres Treated by Aircraft for Agricultural Pest Control

Year	Acres	Year	Acres
1934.....	65,479	1945.....	
1935.....	103,000	1946.....	296,059
1936.....	94,205	1947.....	614,348
1937.....	75,929	1948.....	855,794
1938.....	68,453	1949.....	2,117,006
1939.....	223,094	1950.....	1,916,874
1940.....	69,521	1951.....	2,892,559
1941.....	176,596	1952.....	3,460,321
1942.....	132,701	1953.....	3,525,533
1943.....	149,061	1954.....	3,999,611
1944.....			

agricultural storage, trucks, and railroad cars, and similar agricultural pest control measures.

Table 13 provides the first comparison of the amount of work done by agricultural pest control operators with that done by farmers and others. Not all counties submitted an estimate of acreage treated by persons other than operators, so the total estimate of this additional acreage is known to be low. The incomplete figures show that agricultural pest control operators treated two-thirds of the treated acreage and farmers treated one-third. Operators treated 56 percent of the acreage with aircraft and 11 percent by ground equipment.

Table 14 shows the acres of each crop treated by pest-control operators. This does not include acres treated by farmers themselves inasmuch as a breakdown by crop was not available for such estimated acreages.

TABLE 13
Acreages Treated for Agricultural Pest Control, by Counties

County	Reported by Agricultural Pest Control Operators							Total sprayed	Total dusted	Total treated by operators	Total treated by farmers (estimated)	Total acreage treated in State (estimated)
	By aircraft		By ground equipment			Total						
	Spray	Dust	Total	Spray	Dust		Other					
Kern.....	502,198	355,920	858,118	10,727	686	---	11,413	512,925	356,006	869,531	113,600	893,113
Fresno.....	194,091	266,564	460,655	72,598	5,962	---	78,560	266,689	272,826	539,215	1,151,973	1,691,188
Imperial.....	206,722	170,357	377,079	---	---	---	---	170,357	170,357	377,079	---	377,079
Tulare.....	185,500	113,156	298,656	71,516	19,716	---	91,232	237,025	170,357	389,897	9,123	399,020
San Joaquin.....	49,525	184,813	234,338	12,207	3,061	840	16,108	61,732	187,874	250,446	---	250,446
Riverdale.....	97,752	90,116	187,868	54,618	1,012	1,125	56,755	152,370	87,961	244,623	---	356,123
Kings.....	73,676	67,832	141,508	14,285	---	---	14,285	87,961	61,732	155,793	---	155,793
Butte.....	109,600	10,041	119,641	4,316	---	---	4,316	113,916	83,901	133,057	36,490	160,447
Stanislaus.....	38,557	80,872	119,429	5,083	3,019	5,571	13,673	43,640	83,901	133,102	16,800	149,902
Colusa.....	108,490	6,235	114,725	5,008	---	---	5,008	113,916	6,235	119,733	---	119,733
Yolo.....	60,951	49,846	110,797	7,602	1,640	---	9,242	68,463	50,366	119,949	12,000	131,949
Sutter.....	53,424	30,256	83,680	5,179	---	16	5,195	58,603	30,256	88,875	---	88,875
Madera.....	47,630	39,012	79,942	961	2,829	149	3,939	41,891	41,841	83,881	46,000	129,881
Monterey.....	17,589	59,613	77,202	105,671	11,523	4,718	121,912	123,260	71,136	199,114	23,275	222,389
Glenn.....	69,003	9,051	70,054	5,814	---	---	5,814	74,817	1,051	75,868	15,000	90,868
Merced.....	38,245	29,483	67,728	1,370	389	230	1,989	39,615	29,372	69,717	30,971	100,688
Santa Barbara.....	37,714	25,799	63,513	33,517	8,453	1,452	42,422	70,231	34,352	105,935	15,000	120,935
Ventura.....	30,777	28,729	59,506	63,806	16,748	14,484	93,038	94,583	45,477	154,544	---	154,544
San Luis Obispo.....	42,841	6,463	49,304	2,998	1,589	---	4,587	48,839	8,052	53,891	20,337	74,228
Sacramento.....	28,719	19,856	48,575	11,834	1,966	---	13,800	4,353	21,822	62,375	53,000	115,375
San Bernardino.....	2,417	35,442	37,859	---	---	---	---	35,442	37,859	72,545	---	72,545
San Diego.....	29,991	6,215	36,206	5,885	1,134	600	10,119	38,376	7,349	46,325	118,870	188,870
Tehama.....	9,249	22,997	32,246	661	30	---	691	9,910	32,937	35,272	42,724	52,724
Contra Costa.....	12,779	16,767	29,546	4,707	906	116	5,726	17,483	17,673	35,272	35,272	35,272
Los Angeles.....	21,029	6,557	27,586	45,452	4,050	---	49,502	66,481	10,607	77,088	101,500	178,588
San Benito.....	13,273	13,110	26,383	43,432	1,481	---	5,914	17,706	14,591	32,297	23,576	55,873
Santa Clara.....	---	23,545	23,545	15,008	4,500	125	19,633	15,008	28,045	43,178	275,000	318,178
Orange.....	14,586	6,236	20,822	63,204	992	5,147	69,343	77,790	7,228	80,165	105,665	105,665
Sonoma.....	17,105	2,947	20,052	5,309	1,614	---	6,923	22,414	4,558	26,975	80,520	107,495
Solano.....	8,659	10,271	18,930	4,080	---	4,680	4,680	13,339	10,271	23,610	10,244	33,854
Siskiyou.....	16,464	337	16,801	---	---	---	---	16,464	337	16,801	---	16,801
Modoc.....	14,737	1,287	16,024	261	---	---	261	14,998	1,287	16,285	---	16,285
Alameda.....	2,767	12,975	15,742	605	161	---	766	3,372	13,136	16,508	---	16,508
Lake.....	1,317	11,036	12,353	6,926	369	---	7,295	8,243	13,494	19,588	45,000	64,588
Yuba.....	7,557	3,454	11,011	2,126	13	---	2,139	3,467	13,150	---	---	13,150
Santa Cruz.....	1,892	7,466	9,358	2,673	3,113	---	5,786	4,663	10,579	15,144	---	15,144
Placer.....	7,465	7,792	8,257	2,606	390	---	2,996	9,971	1,182	30,000	30,000	41,153
San Mateo.....	2,484	2,172	4,656	84	---	---	84	2,668	2,172	7,492	32,900	37,640
Napa.....	2,725	715	3,440	4,052	---	---	4,052	6,777	7,115	7,492	---	7,492
Marin.....	2,186	---	2,186	69	---	---	69	2,255	2,255	2,253	1,103	3,358
El Dorado.....	1,620	---	1,620	2,722	---	---	3,096	4,342	374	20,500	20,500	25,216

TABLE 14
Acres of Each Crop Treated by Pest Control Operators

	Aircraft			Ground			Total sprayed	Total dusted	Total treated by operators
	Spray	Dust	Total	Spray	Dust	Other			
Plumas.....	1,400	1,400	1,400	150	1,550	150	1,550	1,550	1,550
Mendocino.....	766	766	766	766	766	766	766	766	766
Amador.....	385	385	385	672	1,057	672	1,057	1,057	1,057
Humboldt.....	200	200	200	1,790	1,990	1,790	1,990	1,990	1,990
Tuolumne.....	700	700	700	700	700	700	700	700	700
Lassen.....	82	82	82	82	82	82	82	82	82
Shasta.....	200	200	200	200	200	200	200	200	200
Del Norte.....	400	400	400	400	400	400	400	400	400
Nevada.....	400	400	400	400	400	400	400	400	400
Totals.....	2,178,510	1,821,101	3,999,611	665,564	97,660	797,797	2,844,074	1,918,761	4,797,408
									7,171,976
Field crops.....									
Cotton.....	753,332	761,250	1,514,782	26,718	5,782	37	780,250	767,032	1,547,319
Rice.....	271,882	3,552	277,444	600	600		272,492	3,552	278,044
Other grains.....	301,082	20,095	321,177	55,267	479		336,349	20,574	370,923
Alfalfa, clovers.....	278,392	132,060	410,452	17,656	302	4,856	296,048	132,362	453,386
Beans.....	31,073	107,434	138,507	5,000	4,652	2,538	127,080	36,673	151,287
All other field crops.....	41,736	22,304	64,040	8,083	333	36	49,819	22,637	72,492
Total field crops.....	1,677,707	1,048,695	2,726,402	113,924	11,548	7,457	1,791,631	1,000,243	2,859,331
Vegetables.....									
Tomatoes.....	12,828	154,380	167,208	242	3,487	603	13,070	157,867	171,540
Potatoes.....	75,477	136,791	212,268	4,664	2,918	587	80,141	139,709	220,437
Lettuce.....	35,127	58,462	93,589	82,433	10,187		117,560	68,649	186,209
All other vegetables.....	95,172	130,636	245,808	31,567	20,617	4,783	126,739	171,253	305,775
Total vegetables.....	218,604	500,269	718,873	118,906	37,209	5,973	337,510	557,478	880,961
Grapes.....	5,868	136,181	142,049	15,213	23,329		21,081	159,510	180,591
Deciduous fruits.....	25,663	57,871	83,634	106,504	12,706	421	132,167	70,677	203,265
Nuts.....	3,872	15,141	19,013	24,084	6,166	6	27,956	21,307	49,289
Berries.....	455	14,650	15,105	315	350	44	771	15,000	15,815
Flowers, ornamentals.....	1,647	12,340	13,987	789	306	11	2,436	12,646	15,093
Subtropical fruits.....	2,068	2,940	5,008	260,900	4,448	2,201	263,868	7,388	273,457
Range and pasture.....	19,995	1,176	20,771	9,292	288		28,867	1,464	30,351
Miscellaneous.....	222,130	31,738	253,868	15,637	1,310	18,460	237,767	33,048	289,275
Total treated by operators.....	2,178,510	1,821,101	3,999,611	665,564	97,660	34,573	2,844,074	1,918,761	4,797,408

BUREAU OF FIELD CROPS

V. O. WOLCOTT, *Chief*

The work of the Bureau of Field Crops consists of four distinct activities under the Agricultural Code:

1. Field Crops Inspection, Division 5, Chapter 7a
2. Commercial Feeding Stuffs, Division 5, Chapter 7a
3. Agricultural Warehouses, Division 6, Chapter 5
4. Public Grain Warehouse Inspection, Division 6, Chapter 5a

Additionally, the bureau performs, in the San Francisco Bay area only, the terminal weighing service provided under the Business and Professions Code. All activities are supported by funds collected under the laws establishing the functions. Facts relating to revenues and expenditures are contained in the financial statement of the department.

Offices and laboratories are maintained at Sacramento, San Francisco, Oakland, Los Angeles, Imperial (seasonal), Stockton, Vallejo and Petaluma.

Each function of the bureau will be discussed separately in this report.

FIELD CROPS INSPECTION

The bureau inspects and grades field crops upon request; and the services are paid for in accordance with a schedule of fees set forth in regulations.

The department has adopted the uniform standards, established by the Secretary of the United States Department of Agriculture, for use in this work. These standards fall into two categories: those under the United States Grain Standards Act, covering all grains, flaxseed and soybeans; and those referred to as permissive standards covering rough rice, milled rice, hay, dry edible beans and peas.

Inspection and grading in accordance with federal standards are under strict supervision of the United States Department of Agriculture. Employees of the bureau doing the work are licensed by this agency after examination and proof of competency. Additionally, the bureau determines quality factors, as requested by the applicant, on a number of field crops for which no official standards have been established. These crops are hops, castor beans, sunflower seed and safflower seed.

The following data indicate the types of services rendered and their growth:

COMMERCIAL FEEDING STUFFS

Commercial feeding stuffs supply the nutritional requirements of most of the poultry and livestock raised in California. It is, therefore, important to the consumer that feeds be factually represented. The requirements of the Agricultural Code, relating to their manufacture, labeling, and sale, provide a practical approach

TABLE NO. 1
INSPECTIONS FOR THE PAST FIVE YEARS OF FIELD CROPS COMMODITIES

Commodity	1950	1951	1952	1953	1954
Corn.....	3,676	4,145	4,350	4,041	4,388
Wheat.....	6,480	9,376	4,739	6,408	5,902
Oats.....	524	613	651	816	667
Barley.....	15,493	14,938	15,333	13,580	22,005
Grain sorghums.....	1,437	2,363	2,323	1,791	2,528
Rye.....	13	17	18	34	26
Flaxseed.....	4,363	4,904	3,912	2,363	3,613
Rice.....	10,617	10,197	12,986	12,995	10,704
Beans.....	6,123	5,037	5,624	5,819	6,274
Dried peas.....	14	15	17	90	107
Hay.....	525	1,272	694	946	698
Miscellaneous.....	371	1,431	2,140	1,333	2,485
Hops.....	596	585	512	467	437
Totals.....	50,232	54,893	53,299	50,682	59,834

toward assurance that feeds are suitable for their intended purpose. Standardized label information, required by law, also provides a means of comparing one feed with another at the time of purchase. All claims are subject to examination by the department, whether they are required by law or made voluntarily.

Enforcement of the law begins in the field where inspectors call upon manufacturers, distributors, retailers, and farmers to obtain samples of the feeds sold. All points are covered but most samples are taken at manufacturing and distributing points for reasons of efficiency. All samples are given a chemical and microscopical analysis to determine their purity, quality, and conformity to specific guarantees.

The work in 1954 showed increased activity in vitamin assays as a result of the greater number of vitamin supplements being sold. There was also a wider usage of feeds containing drugs and an increase in the variety of drugs used in them which expanded the work of the laboratory. Formerly most of the drug mixtures were poultry feeds, but cattle feeds are now included since the use of estrogenic substances in finishing feeds was introduced late in the year.

Direct payment of the inspection tonnage tax on package feeds continued to grow as the preferred method. There were 356 permits to pay in this manner as of July 1, 1954. Approximately 75 percent of the tax revenue was collected under the plan. Experience with the direct payment method has been very satisfactory from all points of view.

The following table summarizes the major activities on commercial feeding stuffs and provides a comparison with previous years.

TABLE II

Statistics indicating the major activities by the bureau in commercial feeding stuffs for 1954, as compared to previous years are shown in the following table:

	1952	1953	1954
Licenses issued as of December 31.....	3,296	3,181	3,107
Calls made by inspectors.....	2,495	3,441	3,120
Lots of feed removed from sale by inspectors.....	47	48	37
Consisted of, in bags.....	13,301	16,852	8,845
Hearings held in regard to violations.....	2	5	4
Laboratory Activity			
Reports of inspection and general analysis.....	8,074	9,032	8,785
Vitamin assays.....	875	1,207	1,509
Analyses for inorganic nutrients and miscellaneous properties.....	954	1,261	1,226
Analyses for additives used for growth promotion or disease control.....	346	527	760
Biological evaluation tests (chick) of broiler fryer feeds..... ^{3/4}	102	57	98
Biological evaluation tests (chick) of protein meals.....	—	78	67
Feeding trials in connection with consumer complaint studies.....	14	5	4

AGRICULTURAL WAREHOUSES (CALIFORNIA BONDED)

The activities under these provisions of the Agricultural Code are only nominal. Seven warehouses with a total capacity of 42,000 tons were under license at the end of 1954.

The optional license and bond provided by the law was widely used at one time. Privately operated services which assure good, safe storage have now almost replaced the services of the department.

PUBLIC GRAIN WAREHOUSE INSPECTION

Registration and inspection of grain warehouses, regularly storing grain for the public, are required in Division 6; Chapter 5a, of the Agricultural Code.

The department must inspect each warehouse at least once each year, to determine the extent of insect infestation in the stored grain. The fees collected under the law must support the work, but are adequate for only one inspection which is performed in the spring as the insects become active. Any grain found to be infested to the extent that it constitutes a menace to other grain is required to be removed or fumigated.

There were 265 warehouses registered at the time of the annual inspection in 1954.

The following data summarize the results of inspections in the past five years:

	1954	1953	1952	1951	1950
Tons of grain examined	109,173	45,796	41,074	103,635	195,000
Tons of grain condemned	4,554	4,314	9,210	7,541	6,306

DIVISION OF MARKETING

W. J. KUHRT, *Chief*

The Division of Marketing includes the bureaus of Markets, Market Enforcement, Milk Control, Market News, Agricultural Statistics, Fruit and Vegetable Standardization, Shipping Point Inspection and Weights and Measures.

Primary responsibilities of the division are:

1. Administration and enforcement of three agricultural marketing control laws, which affect industry, producers and 35 agricultural products.
 - A. The California Marketing Act authorizes the Director of Agriculture to effect marketing orders and agreements, regulations of which apply to either producers or handlers or both.
 - B. The Agricultural Producers Marketing Act authorizes the director to effect marketing programs directly applicable to producers only.
 - C. The California Agricultural Products Marketing Act authorizes the issuance of marketing orders applicable to handlers only. This act may only be used for those commodities for which there is a similar federal marketing order in effect.
2. Enforcement of the Produce Dealers Act and the Processors Law, the regulatory measures enacted to protect producers of farm products.
3. Operation of the federal-state market news service in cooperation with the United States Department of Agriculture. This service reports prices, market conditions demands, supply, carlot movements, cold storage holdings and other pertinent information at local, state-wide and nation-wide markets.
4. Administration and enforcement of two laws effecting production and distribution of market milk and milk products.
 - A. The Milk Control Act provides a plan for regulation of the California market milk industry to insure an adequate supply of pure and wholesome milk at fair and reasonable prices. This statute requires the director to set the minimum prices which distributors pay producers for their milk, and the minimum wholesale and retail prices at which distributors shall sell their products. Another act relating to marketing of milk and other dairy products establishes the method for regulation of fair trade practices in the dairy products industry.
 - B. The Bureau of Milk Control cooperates in administration of the California Dairy Industry Advisory Board Act of 1945. The work of this board, including research, publicity, advertising and education, is financed by the California dairy industry by a levy on the production of butter fat in specified periods.
5. Administration of the Bureau of Agricultural Statistics, also known as the California Cooperative Crop and Livestock Reporting Service, under agreement with the United States Department of Agriculture. The main function of this bureau is to develop, prepare, publish and distribute estimates of the acreage, production and value of all major California crops; record the number and value of the principal species of livestock and poultry, and of the quantity and value of livestock products.
6. Enforce and administer minimum legal standards for specific fruits, vegetables, nuts, eggs and honey.
 - A. Egg standards relate to grades of size and quality which must be marked on containers offered for sale.
 - B. Honey standards require that honey containers be marked with United States grade designations.
 - C. Canning tomato standards relate to compulsory inspection and certification of all loads of canning tomatoes delivered to canneries, to enforce standards of quality and maturity and be so certified.
 - D. The bureau enforces the provision relating to the inspection both of seed potatoes and the resultant crop which are certified free from injurious virus, bacterial or fungus diseases. This service is supported by fees from growers.
7. Inspection and certification of grade and condition of fruits and vegetables throughout California according to United States standards. This work is self-supporting and is performed by the Bureau of Shipping Point Inspection, also known as the California Federal-State Inspection Service.
8. Enforcement and administration of statutes relating to weights and measures and to petroleum. Most of the work in the field is performed by county sealers of weights and measures whose activities are supervised generally by the Bureau of Weights and Measures.

BUREAU OF MARKETS

W. J. KUHRT, *Chief*
E. W. BRAUN, *Associate Chief*

The major activity of the Bureau of Markets continues to be that of handling the administration and enforcement of industry self-help marketing order programs. Such programs are industry formulated and industry administered under the general assistance and supervision of the Department of Agriculture. Enforcement authority is provided through the exercise of the police power of the State. The programs are financed by industry assessments uniformly applied upon the products marketed and are not an expense charged against the general tax funds of the State. Marketing regulations commonly used relate to quality and size regulations, uniform inspection, assessments for promoting market expansion and unfair trade practices. Authorization for research is also common among the programs. Surplus control provisions are used in some instances to balance supplies with reasonable market requirements. Administration of such industry sponsored programs is a marketing service to California agriculture. Such programs are undertaken by growers and handlers to avoid adverse marketing conditions, which frequently are more destructive to agricultural income than damage done by pests or disease or unsound cultural practices.

During 1954 programs in active operation were 28 in number. Summary facts relating to these programs are:

Number of producers directly affected	36,415
Number of handlers ¹	3,040
Producer value of products regulated	\$376,995,000
Total assessments collected	7,765,000
Expenditures for market expansion	5,675,000
Administration and enforcement ²	1,697,000

¹ Including producer-handlers.

² Including inspection costs.

The several programs classified by the enabling statutes under which they are authorized are:

ACTIVE PROGRAMS

California Marketing Act, as Amended

(Chapter 10, Division 6 of the Agricultural Code)

1. Early apples.
2. Fresh asparagus.
3. Processing asparagus.
4. Bedding plants.
5. Bush berries.
6. Dried figs.
7. Grapefruit (grade and size).
8. Extracted honey.
9. Lemon products.
10. Dry-pack lettuce.
11. Lima beans (standard).
12. Olives, canned and green.
13. Canning and freezing cling peaches.
14. Fresh peaches.
15. Fresh Bartlett pears.
16. Fresh Bartlett pear promotion.
17. Canning fall and winter pears.
18. Fresh fall and winter pears.
19. Fresh plums.
20. Delta white potatoes.
21. Long white potatoes.
22. Poultry improvement.
23. Dried prunes.

24. Raisins.
25. Turkey breeding.
26. Turkey promotion.
27. Wine.

Agricultural Producers Marketing Act

(Chapter 11, Division 6 of the Agricultural Code)

1. Canning Bartlett pear program.

California Agricultural Products Marketing Act

(Chapter 12, Division 6 of the Agricultural Code)

1. Walnuts—terminated July 31, 1954.

In addition to the above a number of programs remained inactive during the year. Also six new programs have been requested and are in various stages of formulation.

The State Marketing Order for Walnuts was terminated as of July 1, 1954. To that time it had been operating within the State of California as a companion to a federal program applicable to out-of-state movement. The federal program was amended by the United States Department of Agriculture to include intra-state shipments as well as interstate shipments; accordingly the state program was terminated.

NEW PROGRAMS

Three new marketing order programs were made effective during 1954. Two of these apply to asparagus. The one for fresh asparagus became effective April 12, 1954. Another program for processing asparagus also became effective April 12, 1954. The program for fresh marketing authorizes grade and size regulations; quantity regulations; research projects, including acreage and marketing surveys; advertising and sales promotion; uniform inspection and certification. The program for processing asparagus authorizes quantity regulations; research projects; and advertising and sales promotion.

The third marketing order made effective in 1954 is the Marketing Order for California Bush Berries for Processing, effective September 15, 1954; it authorizes the advisory board to conduct advertising and sales promotion and to make research and survey studies.

AMENDMENTS OF MARKETING ORDERS

During the course of the year a number of marketing orders were amended by major amendment procedures; also several minor amendments were adopted and made effective. Major amendments require the same procedural steps as the formulation of the original marketing order, namely, public hearings are held and industry written assents filed with the Bureau of Markets. The marketing order programs thus amended include those for bedding plants, lemon products, cling peaches and wine.

In the light of a court decision, the Marketing Order for California Bedding Plants was amended to clarify the application of unfair trade practice provisions to situations in the industry and to coordinate the provisions of the marketing order more closely with the provisions of the Unfair Practices Act, also known as Chapter 4, Division 7, Part 2 of the Business and Professions Code. The amended order for bedding plants became effective April 1, 1954.

A public hearing was held during July upon a proposed amended Marketing Order for Lemon Products and the amended marketing order became effective November 3, 1954. Basically the amended order was a continuation of the then effective marketing order.

The Marketing Order for Canning and Freezing Cling Peaches was amended to continue the former annual order and to modify the surplus control provisions contained therein. The amended order became effective March 30, 1954. The term of the order is for a period of three years.

The Marketing Order for Wine, terminated by its own provisions on June 30, 1954, was issued as an amended marketing order effective July 9, 1954. Amendment procedures extended over a longer period of time than would normally have been anticipated, because of a wide divergence of views in the industry with respect to operating provisions and assessment rates. The term of the order is for a period of three years, extending through June 30, 1957.

Minor amendments of clarifying language without a change of substance were adopted for marketing orders for early apples, lemon products (two minor amendments), dried prunes and cling peaches. The respective effective dates are March 29, 1954, January 30, 1954 and July 19, 1954, March 15, 1954, and July 21, 1954.

ENFORCEMENT

Of significant importance is a superior court decision favorable to the department in the case of *People v. Dodd*. *People v. Dodd* is a Bartlett pear case arising under the provisions of the Marketing Order for the Promotion of Fresh Bartlett Pears. The issue involved constitutionality of the advertising and trade promotion provisions of the California Marketing Act and the legality of the signup when the program was instituted. The court opinion held that the act and the marketing order were not inconsistent with the State Constitution; that the signup was proper and judgment was entered for the payment of \$15,983 in delinquent assessments.

Late in 1953 the District Court of Appeal for the Third Appellate District rendered a decision unfavorable to the department in the case of *D'Amico v. Brock*. This case arose from a regulation recommended by the Olive Advisory Board and established by the Director of Agriculture pursuant to the provisions of the Marketing Order for California Canned Olives. With respect to varieties not specifically listed the marketing order authorized the board to recommend and the director to establish minimum size requirements. This was done for olives of the Saint Augustino variety. The court had some difficulty in deciding whether the regulation for the Saint Augustino variety was an administrative rule and regulation or a major amendment. In the final analysis the court ruled that the regulation was in the nature of a major amendment and the procedural steps followed by the director in establishing the regulation should have been those set forth by the statute for a major amendment. In view of the decision of the court, amendments to Chapter 10, Division 6 of the Agricultural Code are being offered to the 1955 Legislature; the proposed amendments are designed to clearly distinguish between seasonal regulations, administrative rules and regulations and major and minor amendments to marketing orders.

Assessments levied pursuant to marketing orders have been established as priority claims in the event of bankruptcy. In the case of *People v. Sunnyside Winery* the Referee in Bankruptcy ruled that the claim of the Director of Agriculture is a valid and subsisting statutory claim for payment under Section 64 (a) of the National Bankruptcy Act. Assessments recovered in this matter amounted to \$14,483.

The normal enforcement activity of the Bureau of Markets during 1954 continued to deal with direct violations of marketing regulations, the checking of compliance with respect to assessment payments and the collection of delinquent or unpaid and overdue assessments. Civil penalty judgments realized through court actions brought by the Office of the Attorney General amounted to \$6,761. Delinquent assessments collected during the year amounted to \$253,182. Investigative audits are made whenever there is reason to believe violations have occurred. Administrative audits are made continuously in order to provide assurance of the collection of all assessments due.

R.M.A. FOOD TRADE SURVEY

A food trade survey for California standard lima beans was made at the request of the Lima Bean Advisory Board, an industry board that assists the director in the administration of the Marketing Order for Standard Lima Beans. The completed survey was prepared into a printed report. Progress statements, however, were made from time to time to the board to assist it in the development of its promotion program. The purpose of the survey was to assemble information that might help the industry in expanding the sale and utilization of California standard lima beans. California standard lima beans are the large dry lima beans grown mainly in the fog belt along the southern coast of the State. The survey is concerned with trade conditions, both favorable and unfavorable, affecting the sale of standard lima beans. The report points out the things that might be done to take advantage of the favorable conditions and the things that need to be done to overcome the unfavorable conditions. It was found that prospects for the expansion of the market for the large limas is much more favorable in the canning utilization than in the distribution in dried form. It is suggested that new uses be explored in line with modern methods of quick food preparations. Also it would appear important for the industry to

adopt a more distinctive name for California standard lima beans in order that they may be identified not only by the trade but by consumers and thereby make it possible for promotional programs to become effective.

The report was well received by the advisory board which requested it be mailed to all producers, processors, warehousemen and distributors of standard lima beans; necessary funds were made available to accomplish the mailing.

PROGRAMS UNDER CONSIDERATION

A number of agricultural industries are considering the formulation of marketing order programs. Programs are in process of discussion and preparation for lambs, chicken fryers, fresh plums, strawberries, cut flowers and heather. In each case industry-wide committees of growers and handlers are active in the development of marketing order provisions designed to apply to their respective industries in a workable manner. It is anticipated that in each case the programs will develop to the stage of public hearing sometime during the early part of 1955.

AN ADVISORY BOARD IN ACTION

In closing our annual report it may be of interest to present a typical advisory board of one of our marketing order programs, together with an organizational chart of its function. The Marketing Order for Canning Cling Peaches is one of the programs of longest standing. With the exception of one season, it has operated under state statutes beginning with 1936. For a few seasons prior to 1936 it operated as a marketing agreement and license under federal marketing statutes.

Currently the program is broad in scope. It includes provisions for equating the available supply of canned peaches with the reasonable market demands therefor, by means of surplus removal regulations and minimum quality and size regulations. On the positive side, it authorizes advertising and sales promotion; research projects, including survey projects and the prohibition of unfair trade practices. The advisory board consists of 11 producer members and their respective alternates and 11 processor or canner and freezer members with their respective alternates. The accompanying picture shows the board at one of its recent sessions. Its functions are advisory and operational in character. The board makes recommendations for regulations and activities to be carried out. Upon approval of the Director of Agriculture regulations become effective and activities may be carried out. The functions are performed by employees of the advisory board. General supervision, enforcement and financial control are exercised by the Bureau of Markets on behalf of the Director of Agriculture. The accompanying organizational chart illustrates the functions and lines of authority in detail.

GENERAL MARKETING SERVICE

In addition to the administration and enforcement of marketing order programs and the making of food trade surveys as R. M. A. projects, the Bureau of Markets responds to many requests for information and assistance in connection with marketing matters in a general sense. These requests come in various forms such as person to person requests, telephone, and written requests. Responses are made in a manner to fit the situation and very often include attendance at agricultural meetings. When new marketing orders are formulated a number of meetings are frequently held as discussion meetings prior to a request by the industry for formal procedures. The discussion meetings are considered a part of the general marketing service. However, if and when a request is made for the holding of a public hearing, the matter ceases to be a general marketing service and becomes a specific matter under the marketing statutes and is financed through trust fund deposits.

BUREAU OF MARKET ENFORCEMENT

J. C. HARLAN, *Chief*

This agency was established in 1931, with the primary duty of enforcing the Produce Dealers Act as well as the Deciduous Fruit Dealers Act.

In 1933 the Agricultural Code was established by the Legislature. The Produce Dealers Act was amended and broadened to include dealers, brokers and agents as licensees. In 1935 the Processors Law was passed, and contained provisions similar to those in the Produce Dealers Act, but exercising its jurisdiction over handlers of farm products for processing purposes. In 1945 amendments to these laws required the posting of surety bonds by dealers and processors.

The Produce Dealers Act and the Processors Law appear as Chapters 6 and 9, Division 6, of the Agricultural Code. Under these laws, handlers of farm products must be licensed and bonded in order to engage in the business of commission merchant, dealer or processor. Brokers, cash buyers and agents also are required to obtain licenses.

Under the Produce Dealers Act the agency exercises jurisdiction over persons who handle farm products on consignment or who purchase farm products in fresh form for distribution through wholesale channels. Practically all farm commodities are included under this act.

Under the Processors Law the agency supervises control over persons who purchase or handle farm products for the purpose of manufacture or processing, and who resell the finished product in dried, canned, extracted, fermented, distilled, frozen or other preserved or processed forms.

These statutes were enacted to protect persons engaged in the production of farm products. For many years controversies arising between producers and handlers have been adjusted by the bureau with a minimum of expense to the parties involved; controls exercised by the bureau, have made difficult the operation of unscrupulous handlers who not only attempt to defraud the producer but who also impose unfair competitive conditions on those licensees who operate legally.

Bureau work is predominantly in the field and involves investigation of complaints against licensees, as well as a continuing supervision of agricultural centers and points of shipping, harvesting or distribution, to insure that all persons active in handling farm products are properly licensed and bonded, and for the additional purpose of encouraging complete and general compliance with the statutes, as to payment and accounting for farm products purchased or handled on a consignment basis.

In general the statutes provide for the faithful and honest handling of farm products by licensees. Commission merchants are required to render true and proper accounts of sale and to make settlement thereon to the consignor. Dealers and processors are required to make payment and settlement with producers, in accordance with the terms of their contracts and as provided by statutory requirements.

Hearings are held on verified complaints filed by producers. When a violation of the statute involved has been determined, a licensee may be subjected to the suspension or revocation of license, or the imposition of probationary terms.

The Bureau of Market Enforcement maintains offices at Sacramento, San Francisco, Los Angeles and Fresno. Producers may file their complaints by telephone, telegram, letter or in person at any one of these offices.

During 1954 the bureau recovered for producers, under the Produce Dealers Act, \$438,072.74, in which 859 producers participated. Under the Processors Law recoveries amounted to \$379,566.82, in which 332 producers participated. The total amount involved under both statutes was \$817,639.56, in which 1,191 producers participated.

DETAILS OF FUNCTIONAL ACTIVITIES

PRODUCE DEALERS

Summary of Complaints Handled—1954

Complaints open January 1, 1954	144
Complaints opened	578
Complaints reopened	39

Complaints closed	600
Amounts adjusted and recovered through the Bureau of Market Enforcement	\$367,001.23
Number of complainants participating in these recoveries.....	443
Amount recovered through bond actions.....	71,071.51
Number of complainants participating in these recoveries.....	416
Total amount adjusted and recovered.....	\$438,072.74
Total number of complainants participating.....	859

RECOVERIES BY COUNTIES

County		Produce Dealers—1954	Amount	Partici- pants
Alameda	through Bureau of Market Enforcement		\$3,315.50	5
	through bond recovery		750.18	4
Butte	through Bureau of Market Enforcement		1,366.66	1
	through bond recovery		864.28	5
Colusa	through bond recovery		4.49	1
Contra Costa	through Bureau of Market Enforcement		1,193.70	1
	through bond recovery		24.42	1
El Dorado	through Bureau of Market Enforcement		1,000.00	1
Fresno	through Bureau of Market Enforcement		24,761.20	31
	through bond recovery		3,109.81	23
Imperial	through Bureau of Market Enforcement		13,866.08	24
	through bond recovery		3,372.16	33
Kern	through Bureau of Market Enforcement		27,999.34	15
	through bond recovery		2,010.88	15
Kings	through Bureau of Market Enforcement		1,090.93	4
	through bond recovery		27.81	1
Los Angeles	through Bureau of Market Enforcement		54,676.16	53
	through bond recovery		12,333.85	140
Madera	through Bureau of Market Enforcement		14,398.31	13
	through bond recovery		759.45	4
Marin	through Bureau of Market Enforcement		59.00	1
Mendocino	through bond recovery		27.14	1
Merced	through Bureau of Market Enforcement		4,724.47	13
	through bond recovery		650.54	4
Monterey	through Bureau of Market Enforcement		9,420.23	7
	through bond recovery		5,797.43	27
Orange	through Bureau of Market Enforcement		2,419.67	4
	through bond recovery		830.09	8
Riverside	through Bureau of Market Enforcement		53,484.04	30
	through bond recovery		6,060.75	11
Sacramento	through Bureau of Market Enforcement		4,076.71	11
	through bond recovery		78.47	2
San Benito	through Bureau of Market Enforcement		400.00	1
	through bond recovery		1,240.11	4
San Bernardino	through Bureau of Market Enforcement		5,769.35	12
	through bond recovery		1,636.41	7
San Diego	through Bureau of Market Enforcement		9,767.95	15
	through bond recovery		8,401.33	24
San Francisco	through Bureau of Market Enforcement		4,790.07	16
	through bond recovery		435.03	1
San Joaquin	through Bureau of Market Enforcement		13,101.27	37
	through bond recovery		1,308.17	2
San Luis Obispo	through Bureau of Market Enforcement		19,533.96	7
	through bond recovery		3.20	1
San Mateo	through Bureau of Market Enforcement		20,224.31	25
	through bond recovery		1,354.19	1
Santa Barbara	through Bureau of Market Enforcement		2,643.65	4
	through bond recovery		1,968.19	7
Santa Clara	through Bureau of Market Enforcement		18,000.02	38
	through bond recovery		3,681.25	24

Santa Cruz	through Bureau of Market Enforcement	6,678.49	13
	through bond recovery	3,149.03	18
Siskiyou	through Bureau of Market Enforcement	2,700.00	3
	through bond recovery	78.95	2
Solano	through Bureau of Market Enforcement	5,606.38	2
Sonoma	through Bureau of Market Enforcement	3,357.15	4
	through bond recovery	1,724.09	14
Stanislaus	through Bureau of Market Enforcement	2,221.46	8
	through bond recovery	721.66	2
Tehama	through Bureau of Market Enforcement	522.02	3
	through bond recovery	36.64	3
Tulare	through Bureau of Market Enforcement	7,753.61	24
	through bond recovery	8,550.79	16
Ventura	through bond recovery	38.92	2
Yolo	through Bureau of Market Enforcement	25,276.31	15
Yuba	through Bureau of Market Enforcement	487.56	1
Out-of-State	through Bureau of Market Enforcement	315.67	1
	through bond recovery	41.80	8
Total through Bureau of Market Enforcement		\$367,001.23	443
Total through bond recovery		71,071.51	416
		\$438,072.74	859

ACTIONS AGAINST LICENSES

Total number of licenses canceled or revoked	18
Total number of licenses suspended	11
Total number of licenses refused	14
Total number of licenses reinstated	0

PROSECUTIONS AND RESULTS—1954

Total number of prosecutions initiated	61
Jail sentences served	4
Total jail sentences suspended or probation granted	35
Fines assessed (paid)	23
Fines suspended	0
Cases pending	23
Cases dismissed or withdrawn	19
Department hearings	117

PROCESSORS LAW

Summary of Complaints Handled—1954

Complaints open January 1, 1954	39
Complaints opened	46
Complaints reopened	5
Complaints closed	76
Amount adjusted and recovered through the Bureau of Market Enforcement	\$326,554.42
Number of complainants participating in these recoveries	82
Amount recovered through bond actions	53,012.40
Number of complainants participating in these recoveries	250
Total amount adjusted and recovered	\$379,566.82
Total number of complainants participating	332

RECOVERIES BY COUNTIES

Processors—1954

County	Amount	Partici- pants
Alameda	2,342.32	3
	288.47	2
Butte	926.10	1
	480.56	1
Colusa	77.31	2

Contra Costa	through bond recovery	91.23	2
El Dorado	through bond recovery	645.25	1
Fresno	through Bureau of Market Enforcement	62,725.97	10
	through bond recovery	7,457.43	14
Glenn	through Bureau of Market Enforcement	7,669.13	1
	through bond recovery	130.41	1
Imperial	through bond recovery	227.04	1
Kern	through bond recovery	1,115.35	8
Kings	through Bureau of Market Enforcement	749.17	1
Los Angeles	through Bureau of Market Enforcement	6,299.62	2
	through bond recovery	1,515.54	4
Madera	through bond recovery	33.05	1
Merced	through Bureau of Market Enforcement	25,411.65	5
	through bond recovery	468.16	7
Napa	through Bureau of Market Enforcement	500.00	1
Orange	through Bureau of Market Enforcement	49.83	1
	through bond recovery	25.88	1
Riverside	through Bureau of Market Enforcement	839.23	1
	through bond recovery	2,375.34	24
Sacramento	through Bureau of Market Enforcement	20.48	1
	through bond recovery	1,388.51	2
San Benito	through Bureau of Market Enforcement	100.66	1
San Francisco	through Bureau of Market Enforcement	427.71	1
	through bond recovery	939.75	4
San Joaquin	through Bureau of Market Enforcement	25,630.72	9
	through bond recovery	5,522.72	30
San Mateo	through bond recovery	72.66	1
Santa Barbara	through bond recovery	2,010.25	1
Santa Clara	through Bureau of Market Enforcement	145,666.12	22
	through bond recovery	7,957.44	57
Santa Cruz	through Bureau of Market Enforcement	1,269.00	3
Solano	through bond recovery	549.81	1
Sonoma	through Bureau of Market Enforcement	757.05	2
Stanislaus	through Bureau of Market Enforcement	3,715.34	8
	through bond recovery	8,096.30	49
Sutter	through Bureau of Market Enforcement	9,200.00	1
Tehama	through Bureau of Market Enforcement	9,138.68	2
	through bond recovery	6,684.17	16
Tulare	through Bureau of Market Enforcement	21,565.53	3
	through bond recovery	4,574.10	18
Yolo	through Bureau of Market Enforcement	1,047.87	2
	through bond recovery	24.86	1
Yuba	through Bureau of Market Enforcement	502.24	1
	through bond recovery	260.81	1
Total through Bureau of Market Enforcement		\$326,554.42	82
Total through bond recovery		53,012.40	250
		\$379,566.82	332

ACTIONS AGAINST LICENSES

Total number of licenses canceled or revoked	3
Total number of license suspended	1
Total number of licenses refused	1
Total number of licenses reinstated	0

PROSECUTIONS AND RESULTS—1954

Total number of prosecutions initiated	0
Jail sentences served	0
Total jail sentences suspended or probation granted	0
Fines assessed (paid)	0
Fines suspended	0
Cases pending	0
Cases dismissed or withdrawn	0
Department hearings	20

LICENSES ISSUED, DETAIL OF ACTION ON LICENSES AND ON PROSECUTIONS

Summary of All Activities

Complaints open January 1, 1954	183
Complaints opened	624
Complaints reopened	44
Complaints closed	676
Amounts adjusted and recovered	\$693,555.65
Number of complainants participating in these recoveries	525
Amount recovered through bond activities	124,083.91
Number of claimants to these recoveries	666
Total adjustments	\$817,639.56
Total number of complainants participating in adjustments	1,191

PROSECUTIONS AND RESULTS

Total number of prosecutions initiated	61
Total jail sentences served	4
Total jail sentences suspended or probation granted	35
Fines assessed (paid)	23
Fines suspended	0
Cases pending	23
Cases dismissed or withdrawn	19
Department hearings	137

LICENSES ISSUED IN 1954

Produce Dealers Act	11,908
Dealers	4,248
Brokers	1,433
Commission merchant	1,101
Cash buyers	881
Agents	4,245
Processors Law	2,300
Processors	650
Agents	1,650

CANCELLATIONS, REVOCATIONS, SUSPENSIONS, REFUSALS
AND REINSTATEMENTS

	<i>Produce dealers</i>	<i>Processors</i>
Canceled or revoked	18	3
Suspended	11	1
Refused	14	1
Reinstated	0	0

TWENTY-EIGHT-YEAR RECORD

Tabulated below is a condensed summary of the activities of the Bureau of Market Enforcement in the administration of the regulatory statutes assigned to it for a 28-year period.

	<i>Complaints closed</i>	<i>Licenses revoked</i>	<i>Licenses refused</i>	<i>Prosecu- tions</i>	<i>Hearings</i>	<i>Recoveries for growers</i>
1927	23	0	0	0	0	\$8,600
1928	203	0	0	3	2	8,200
1929	330	1	0	3	0	34,300
1930	241	0	3	3	4	62,600
1931	351	0	5	3	7	67,200
1932	477	6	3	10	25	67,100
1933	924	7	2	13	50	129,800
1934	832	53	3	50	80	106,400
1935	930	64	10	68	168	136,500
1936	1,170	50	16	79	150	161,400
1937	1,150	68	7	71	127	334,000
1938	1,475	67	13	59	252	519,300

1939	1,363	86	22	83	219	402,500
1940	1,188	86	14	55	251	476,600
1941	1,407	22	25	82	439	655,700
1942	873	17	228	36	300	320,500
1943	527	25	11	11	136	278,100
1944	411	11	9	15	114	357,500
1945	458	4	19	14	93	624,300
1946	555	11	68	21	128	455,600
1947	706	13	7	34	166	982,600
1948	834	21	8	56	212	761,400
1949	993	18	10	34	157	1,130,000
1950	773	15	12	42	135	925,400
1951	576	10	3	26	110	682,307
1952	644	20	10	30	126	534,886
1953	600	11	13	44	141	615,482
1954	676	21	15	61	137	817,639

NOTE: Recoveries for growers stated in round figures. 1935-1944, inclusive, figures represent activities in enforcement of milk control laws, marketing orders and agreements and other measures now handled by Bureau of Milk Control and Bureau of Markets. 1945-1954, inclusive, figures reflect activities exclusively under Chapter 6, Division 6 (Produce Dealers Act), and Chapter 9, Division 6 (Processors Law), of Agricultural Code.

PRODUCE DEALERS ACT

COURT ACTIONS

Cases Pending

- A. A. Brock v. Fidelity and Deposit Company of Maryland:* Suit was filed in Municipal Court, City and County of San Francisco, during 1953, in behalf of producer-creditors of Claude E. Jackson. This matter is now awaiting trial, although no trial date has been set. The Attorney General's Office has been requested to file with the court a motion to set the matter for trial.
- A. A. Brock v. General Casualty Company:* Suit was filed in Superior Court, County of Tulare, No. 45266, in April, 1954, in behalf of the producer-creditors of Sandilands Fruit Company and/or Allen & Sandilands. Defendant's demurrer to the original complaint was sustained on May 6, 1954, and an amended complaint subsequently filed by the State, with the result that defendant's demurrer to the amended complaint was overruled on August 27, 1954. Answer to the amended complaint has been filed since December 31, 1954, and the matter is now awaiting trial. The claims of the producer-creditors amount to in excess of \$26,000 incurred over a long period of time, during which time there was a bond in full force and effect.
- A. A. Brock v. Glens Falls Indemnity Company:* Suit was filed in Municipal Court, City and County of Los Angeles, No. 123281, on September 4, 1953, in behalf of producer-creditors of Orange Hill Groves. After trial, judgment was rendered in favor of defendant and an appeal taken on September 29, 1954. On December 13, 1954, judgment of the trial court was reversed, and on December 30, 1954, an order was issued transferring the case to the Superior Court, City and County of Los Angeles, No. 639549, where it now awaits trial.
- A. A. Brock v. Fireman's Fund Indemnity Company:* Suit was filed in Superior Court, City and County of Los Angeles, in 1952, in behalf of the producer-creditors of Calvin E. Sides, dba Coachella Valley Produce Terminal. On October 9, 1952, the matter was referred to referee, and on December 16 and 29, 1952, hearings were held before the referee, who determined that the complaints of complainants were correct and referred the matter back to the superior court. On January 26, 1953, trial was held and the matter submitted on briefs. On July 17, 1953, an order was issued permitting the defendant to file an amended answer, on condition that the case be reopened to permit the plaintiff to introduce such evidence as was necessary to refute the issues raised. On September 24, 1954, trial was had on the issues raised by the defendants. Argument on the amended answer was submitted on briefs, and a judgment is expected early in 1955.

Cases Closed

- A. A. Brock v. Glens Falls Indemnity Company:* Suit was filed in Municipal Court, City and County of Los Angeles, No. 137272, in September, 1953, in behalf of

producer-creditors of Pete Stumpf, dba Crown Poultry Company. After trial on August 11, 1954, judgment was given in favor of plaintiff for the penal sum of the bond, plus interest.

A. A. Brock v. Fidelity and Deposit Company of Maryland: Suit was filed in Municipal Court, City and County of Los Angeles, No. 614003, on May 20, 1953, in behalf of producer-creditors of Superior Produce Distributors. Subsequent to trial, in April, 1954, judgment was rendered in favor of plaintiff for the penal sum of the bond, plus interest and costs.

A. A. Brock v. Fidelity and Casualty Company of New York: Suit was filed in Municipal Court, City and County of Los Angeles, in November, 1953, in behalf of producer-creditors of Universal Produce Company. Subsequently, several of the complainants filing verified claims with the director withdrew their complaints, and settlement for the balance of the claims was negotiated with the bonding company out of court and the matter dismissed.

Hansen v. Jacobsen: Suit was filed in Superior Court, City and County of San Francisco, No. 438506, on May 24, 1954, petitioning for writ of mandate seeking to set aside the order of the Director of Agriculture suspending the license of John R. Hansen Company. Trial was held on July 29, 1954, after which peremptory writ was issued setting aside the findings and order of suspension of license of John R. Hansen Company, and remanding the proceedings back to the director for further consideration.

PROCESSORS LAW

COURT ACTIONS

Cases Pending

A. A. Brock v. Western National Indemnity Company: Suit was filed in Superior Court, City and County of San Francisco, No. 418976, in July, 1952, in behalf of producer-creditors of Clara-Val Packing Company. Judgment was rendered in favor of plaintiff on July 13, 1953. Subsequently defendant filed a motion for rehearing, which was denied on November 16, 1953. Thereafter defendant filed an appeal with the First Appellate Court, District Court of Appeals. All briefs have now been filed and the matter is scheduled for trial in March, 1955.

Puccinelli v. Jacobsen: On November 15, 1954, suit was filed in Superior Court, Stanislaus County, No. 54111, petitioning for a writ of mandate and order to stay the operation of an administrative order and decision revoking the license of Puccinelli Packing Company. The alternative writ of mandate and order staying the operation of the administrative order and decision was issued at that time. Respondent's answer was filed on December 13, 1954, and on December 17, 1954, a stipulation was filed providing for a full review by the court of the complete record of the proceeding before the department. Petitioner's brief was filed January 7, 1955, and respondent's reply brief was filed February 7, 1955.

Cases Closed

A. A. Brock v. Peerless Casualty Company: Suit was filed in Superior Court, County of Stanislaus, No. 51984, on January 30, 1954, in behalf of producer-creditors of Pacific Grape Products Company. After adjudication of bankruptcy of Pacific Grape Products Company, defendant paid to the Director of Agriculture the amount of his demand, without trial, and on December 16, 1954, motion to dismiss the matter was filed.

W. C. Jacobsen v. Seaboard Surety Company: Suit was filed in Superior Court, County of Fresno, No. 91575, in May, 1954, in behalf of producer-creditors of B. Cribari & Sons. On or about June 16, 1954, full settlement of the demand of the director was made out of court by the defendant, and the matter dismissed.

DETAIL OF PROSECUTIONS—1954

PRODUCE DEALERS ACT

Adams, Henry; Merced: Warrant, Merced County, September 30, 1954, on charges of operating as dealer and commission merchant without licenses. Pending.

Ames, J. D.; Modesto: Warrant, Stanislaus County, September 24, 1954, on charges of operating as a dealer without a license. On October 22, 1954, defendant plead guilty and was placed on six months' probation; fined \$50, with the further stipulation that all growers be paid in full. Closed.

- Anderson, Raymond; Lancaster: Warrant, San Bernardino County, November 15, 1954, on charge of acting as a dealer without a license. Pending.
- Bailes, Emmel Curtis; Marina: Warrant, Monterey County, July 15, 1954, on charge of operating as a dealer without a license. Trial was held on November 22, 1954. Defendant given 30 days' suspended sentence; fined \$100; two years' probation. Must obtain proper license with Bureau of Market Enforcement before engaging in the produce business. Closed.
- Bertolino, Chas.; San Diego: Warrant, Imperial County, December 29, 1953, on charge of operating as a dealer without a license. Trial was held on February 12, 1954. Defendant was sentenced to jail for one year; sentence suspended and commitment withheld. Placed on three years' probation. Closed.
- Berumen, Bob; Fowler: Warrant, Fresno County, February 16, 1954, on charge of operating as a dealer without a license. Defendant plead guilty; received a 30-day suspended sentence; probation for 180 days, and instructed to comply with the Agricultural Code. Closed.
- Berumen, Bob; Fowler: Warrant, Fresno County, April 6, 1954, on charge of operating as a dealer without a license. Pending.
- Bradley, O. D.; Fresno: Warrant, Madera County, December 15, 1953, on charge of operating as a commission merchant without a license. Dismissed on June 21, 1954, by Judge Murray, Superior Court, Madera County, upon payment to the grower of the amount due. Closed.
- Bradley, R. L.; Fresno: Warrant, Madera County, December 15, 1953, on charge of operating as a dealer without a license. Dismissed on June 21, 1954, by Judge Murray, Superior Court, Madera County, upon payment to the grower of the amount due. Closed.
- Brown, Willie; Los Angeles: Warrant, Fresno County, August 18, 1953, on charge of operating as a dealer without a license. Trial was held on November 4, 1953. Defendant fined \$50; given a 90-day suspended sentence; paid grower amount due, and shall not engage in the produce business without being properly licensed. Closed.
- Burkley, Emery R.; Modesto: Warrant, Stanislaus County, October 8, 1954, on charge of operating as a dealer without a license. On November 12, 1954, defendant was fined \$50 and placed on probation for one year. Terms of probation being \$50 fine, plus full restitution to all grower-creditors. Closed.
- Cavagnaro, Tony; Stockton: Warrant, Riverside County, August 30, 1954, on charge of operating as a dealer without a license. Trial was held November 1, 1954. After considerable evidence by both parties, the defense attorney brought up question of venue, i.e., asked judge to rule not guilty on Section 1273(2). Taken under advisement by judge. Final disposition, not guilty. Closed.
- Chester, W. M.; Sacramento: Warrant, Sutter County, September 14, 1954, on charge of operating as a dealer without a license. Pending.
- Chester, W. M.; Sacramento: Warrant, Yolo County, September 21, 1954, on charge of operating as a dealer without a license. Pending.
- Clesceri, George; Los Angeles: Warrant, Riverside County, August 27, 1954, on charge of operating as a dealer without a license. Trial was held on September 17, 1954. Paid \$100 fine; one year probation. Closed.
- Corica, Frank; San Jose: Warrant, Santa Clara County, June 7, 1954, on charge of operating as a dealer without a license. Dismissed on recommendation of District Attorney. Closed.
- Dahlgren, Walter; Corning: Warrant, Glenn County, February 10, 1953, on charge of operating as an agent without a license. Trial was held in superior court on March 10, 1954. Defendant found guilty; fined \$500; given 90-day suspended sentence, and two years' probation. Closed.
- Davis, Harrison; Rodeo: Warrant, San Joaquin County, August 13, 1954, on charge of operating as a dealer without a license. On December 6, 1954, prosecution was dismissed due to defendant's illness. Closed.
- Davis, J. C.; Richmond: Warrant, Stanislaus County, October 30, 1953, on charge of operating as a dealer without a license. In July, 1954, District Attorney had this case placed in justice court instead of municipal court. Judge Carlson dismissed the case due to failure to file in correct court. A new complaint could not be filed since once a case is dismissed it cannot be retried. Closed.
- Dodd, Jesse T.; Phoenix, Arizona: Warrant, Imperial County, November 17, 1954, on charge of acting as a dealer without a license. Pending.
- Doughty, A. C.; Fontana: Warrant, San Bernardino County, September 14, 1954, on charge of acting as a dealer without a license. Trial was held on October 20,

1954. Defendant fined \$50 and sentenced to 60 days in the county jail. Sixty-day jail sentence was suspended for three years. Closed.
- Ellis, May; Banning: Warrant, Riverside County, December 30, 1953, on charge of operating as a dealer without a license. Preliminary trial was held on April 5, 1954. Defendant paid \$52.50 to complainant, which amount was accepted by complainant as payment in full. Complaint and action were dismissed on March 29, 1954. Closed.
- Evanhoff, D. J.: Warrant, Imperial County, May 26, 1954, on charge of assuming to operate as a dealer without a license. Pending.
- Farnsworth, Paul, Jr.; Winters: Warrant, Yolo County, January 20, 1954, on charge of operating as a dealer without a license. Trial was held on February 8, 1954. Defendant fined \$150; placed on probation for two years, with the provision that during the term of probation he make full restitution to his producer-creditors in the sum of \$6,588. Closed.
- Gallardo, Pete; Bakersfield: Warrant, Stanislaus County, February 4, 1954, on charge of operating as a dealer without a license. Pending.
- Garcia, Charles; San Jose: Warrant, Santa Clara County, December 11, 1953, on charge of operating as dealer or cash buyer without license. Defendant applied for probation; hearing on application for probation held on January 15, 1954. Fined \$50 and released. No probation or jail sentence. Closed.
- Greer, Lloyd Charles; Ontario: Warrant, Riverside County, September 25, 1953, on charge of operating as a dealer without a license. On January 26, 1954, defendant requested dismissal of the complaint since the complainant had been paid in full. Request granted and case dismissed. Closed.
- Hackett, L.; Salinas: Warrant, Stanislaus County, February 2, 1954, on charge of operating as a dealer without a license. Trial was held on February 27, 1954. Defendant found guilty; fined \$100. Closed.
- Hackett, Lawrence; Salinas: Warrant, Monterey County, April 29, 1954, on charge of operating as a dealer without a license. Preliminary trial held on May 6, 1954; plead guilty, and applied for probation. Probation for one year; make complete restitution to grower by payments through county probation officer; also, to report his resident address and occupation monthly during period of probation. Closed.
- Hare, Jack; Shafter: Warrant, Fresno County, September 21, 1953, on charge of operating as a commission merchant without a license. Defendant fined \$250 and placed on probation for one year. Closed.
- Hickman, Walter; Santa Ana: Warrant, Imperial County, July 23, 1953, on charge of operating as a dealer without a license. Trial was held on September 11, 1953. Defendant found guilty. One year each on counts one, two and three; six months to be served in county jail; within 60 days of release any and all property owned by defendant to be sold for debts; to pay \$100 per month until debt cleared, with 15 years' probation. Closed.
- Hill, Bert; Aptos: Warrant, Santa Cruz County, September 15, 1954, on charge of operating as a dealer without a license. Thirty days' suspended. Three years' probation, with order that if defendant deals in farm products he is to obtain proper license and make restitution to grower in the amount of \$346.65. Closed.
- Hodgkins, Harold C.; Chico: Warrant, Tehama County, April 9, 1954, on charge of operating as a dealer without a license. Trial was held on July 28, 1954. Two years' sentence suspended under terms and conditions that growers be paid in full. Payment made to court for distribution to growers. Closed.
- Holt, Tomile; San Bernardino: Warrant, Stanislaus County, March 25, 1954, on charge of operating as a dealer without a license. On July 15, 1954, Deputy D. A. Gorgas dismissed this case in view of the fact that the grower had been paid in full. Closed.
- Hurley, Alton D.; San Francisco: Warrant, Merced County, September 2, 1953, on charge of operating as an agent without a license. Trial was held on March 26, 1954. Case was dismissed by Judge Maushart, superior court, because third party claim filed by grower setting forth the farm products were his at all times, upon which defense claimed therefore there was no sale involved. Closed.
- James, Ray; Oakland: Warrant, Yolo County, November 3, 1953, on charge of operating as a dealer without a license. On August 10, 1954, defendant was found guilty in Stockton Superior Court on a felony charge and sentenced to state prison. On August 12, 1954, Deputy D. A. Avila of Woodland was notified of the above action, and dismissed our complaint by reason of the action in Superior Court in Stockton. Closed.

- James, Ray; Oakland: Warrant, San Joaquin County, December 23, 1953, on charge of operating as a dealer without a license. Deputy D. A. Willet dismissed this case on May 21, 1954, as defendant was bound over to Superior Court on a felony complaint, which complaint would take precedence over our misdemeanor. Closed.
- Jewell, Glen; El Centro: Warrant, Imperial County, November 17, 1954, on charge of operating as a dealer without a license. Trial was held on November 26, 1954. Sentenced to one year in county jail; sentence suspended for period of probation (three years' probation). Fined \$200; ordered to pay complainant \$173 at not less than \$20 per month. Closed.
- Johnson, Harlin; Bakersfield: Warrant, Merced County, September 17, 1954, on charge of operating as a dealer without a license. Pending.
- Johnston, Jim; Stockton: Warrant, Fresno County, August 23, 1954, on charge of operating as a dealer without a license. Pending.
- Kelting, Clark E.; Santa Barbara: Warrant, Riverside County, January 12, 1950, on charge of operating as an agent without a license. Trial was held on April 20, 1954. Defendant placed on probation for one year; shall have no violations during that time. Closed.
- Khoury, William; Reedley: Warrant, Fresno County, September 30, 1954, on charge of operating as a dealer without a license. Six months' suspended sentence; two years' probation; fined \$150; restitution to be made to grower by signing all moneys due from the wineries, and to secure a license as required by the Agricultural Code if any further operations are engaged in. Closed.
- Lambe, Frank; Fresno: Warrant, Fresno County, August 18, 1953, on charge of acting as an agent without a license. Defendant was found not guilty on appeal. Closed.
- Landrus, Lawrence C.; Santa Rosa: Warrant, Yolo County, June 25, 1954, on charge of operating as a dealer without a license. Trial was held on September 10, 1954. Defendant fined \$1,000 and sentenced to 10 months in county jail. Closed.
- Leon, Cruz; Cucamonga: Warrant, Los Angeles County, August 5, 1954, on charge of operating as a dealer without a license. Pending.
- Lewis, Ben; Fresno: Warrant, Fresno County, February 16, 1954, on charge of operating as a dealer without a license. Trial was held on February 18, 1954. Defendant plead guilty. Fined \$500, which was suspended; placed on probation for two years, and ordered to apply for a license before buying any farm products, or the \$500 fine will have to be paid. Closed.
- Lopez, Pete; Turlock: Warrant, Stanislaus County, May 21, 1954, on charge of operating as a dealer without a license. Defendant was placed on probation for two years, providing restitution made to complaining grower. Closed.
- Lunde, Walter; Washington: Warrant, San Joaquin County, October 30, 1953, on charge of operating as a dealer without a license. Defendant appeared on March 16, 1954, on a bench warrant; fined \$25, and released. Closed.
- Lunde, Walter; Washington: Warrant, San Joaquin County, April 6, 1954, on charge of operating as a dealer without a license. Dismissed on May 5, 1954, in the interest of justice, since producers had been paid in full and defendant had secured proper license. Closed.
- Martinez, Joe; Mexicali and/or Calexico: Warrant, San Bernardino County, August 23, 1954, on charge of operating as a dealer without a license. Pending.
- Myers, John W.; Fresno: Warrant, Los Angeles County, February 2, 1954, on charge of operating as an agent without a license. On February 24, 1954, defendant appeared and was placed on probation under the following terms and conditions: that he be placed on probation for a period of one year; cooperate in a program with the probation department to take care of his delinquent debts to the nurseries; obey all further orders of the court and probation department; and discontinue operating his nursery unless legally licensed to do so. Closed.
- McCartney, Rex; Hanford: Warrant, Tulare County, September 16, 1954, on charge of acting as a dealer without a license. Dismissed upon request of District Attorney. File being held open pending discussion with new District Attorney with view of securing another complaint on the same charge. Pending.
- McCoy, D. B.; Fresno: Warrant, Fresno County, October 16, 1953, on charge of operating as a dealer without a license. Dismissed due to the facts that complainant in the matter had not given the true facts to the District Attorney's office. Closed.
- McLaughlin, C. L.; Stockton: Warrant, San Joaquin County, September 21, 1954, on charge of operating as a dealer without a license. Dismissed.
- Nichols, Robert; Tulare: Warrant, Tulare County, July 22, 1954, on charge of operating as a dealer without a license. Sentence of six months suspended; two

years' probation; restitution of \$446 to be paid to complainants in 14 installments. Closed.

Nowakowski, Anthony H.; Salinas: Warrant, Monterey County, May 6, 1954, on charge of operating as a dealer without a license. Deputy District Attorney preferred to prosecute a violation of Section 476A, Penal Code, rather than a violation of Section 1273, Agricultural Code.

Oliver, J. B.; Los Angeles: Warrant, Fresno County, October 16, 1953, on charge of operating as a dealer without a license. Defendant fined \$35; restitution made to grower; placed on probation for one year. Closed.

Perkins, N. B.; Memphis, Tennessee: Warrant, Kern County, August 11, 1954, on charge of operating as dealer and commission merchant without licenses. Subject is in Tennessee. File closed August 17, 1954. To be reopened in the event subject returns to California.

Poladian, Dick; San Francisco: Warrant, San Joaquin County, November 17, 1953, on charge of operating as a dealer without a license. Trial was held on January 28, 1954. Fined \$50; sentence of 30 days' suspended, and grower to be paid in full. Closed.

Prell, David; Yakima, Washington: Warrant, Kern County, December 14, 1953, on charge of operating as an agent without a license. Defendant was given 180 days' suspended sentence for one year; ordered not to operate without a license or he will have to serve jail sentence. Closed.

Rainie, Wilton; Salinas: Warrant, Monterey County, July 15, 1954, on charge of operating as a dealer without a license. Thirty-day suspended sentence; fined \$100, and two years' probation. Defendant to obtain proper license with bureau before engaging in produce business. Closed.

Ramirez, Lorenzo; Watsonville: Warrant, Santa Cruz County, August 11, 1954, on charge of operating as a dealer without a license. Arraigned September 7, 1954. Fine of \$200 was suspended; given two years' probation; restitution of \$150 to be made to grower, \$100 of which was transmitted to complainant on September 15, 1954; balance of \$50 due and payable to the department on or before September 30, 1954. Closed.

Ramirez, Ray; Indio: Warrant, Kern County, October 26, 1954, on charge of operating as dealer and cash buyer without license. Pending.

Roberson, Vernon; Modesto: Warrant, Stanislaus County, August 12, 1954, on charge of operating as a dealer without a license. Pending.

Rose, Paul; San Bernardino: Warrant, San Bernardino County, June 11, 1954, on charge of operating as a dealer without a license. Pending.

Rossi, Al; Stockton: Warrant, San Joaquin County, September 21, 1954, on charge of operating as a dealer without a license. Defendant fined \$250. Closed.

Roy, J. F.; Oregon: Warrant, Siskiyou County, January 20, 1954, on charge of operating as a dealer without a license. Pending.

Russo, Andrew, and/or Russo, J.; Gardena: Warrant, Riverside County, August 24, 1954, on charge of operating as a dealer without a license. Pending.

Saladana, Louis (aka Gilbert, Hipolite and H.); Salinas: Warrant, Monterey County, April 29, 1954, on charge of operating as a dealer without a license. Pending.

Saso, Joe; Riverbank: Warrant, San Joaquin County, January 13, 1954, on charge of operating as a dealer without a license. On February 2, 1954, defendant was found guilty; fined \$25, and given a 60-day suspended sentence. Restitution in full to be paid within 10 days; probation for one year, with the provision there is no violation of the Agricultural Code. Closed.

Smith, John; Warrant, Stanislaus County, October 28, 1954, on charge of operating as a dealer without a license. Pending.

Sprock, Robert; Morro Bay and Elk Grove: Warrant, San Joaquin County, June 4, 1954, on charge of operating as a dealer without a license. Trial was held on September 14, 1954. Sentence of six months in county jail, four months of which was suspended; placed on two years' probation. Closed.

Sprock, Robert; Morro Bay and Elk Grove: Warrant, Sacramento County, June 10, 1954, on charge of operating as a dealer without a license. Trial was held on July 6, 1954. Defendant found guilty; sentenced to 120 days in county jail, 105 days of which was suspended. Restitution in full made to producer. Closed.

Stone, Ralph; Bakersfield: Warrant, Kern County, March 10, 1954, on charge of operating as a dealer without a license. Defendant fined \$25 and ordered to refrain from dealing in produce until properly licensed. Closed.

- Supnet, Sam; Los Gatos: Warrant, San Joaquin County, May 5, 1954, on charge of operating as a dealer without a license. Defendant found guilty and fined \$250. Closed.
- Thompson, Bill Lee (Alias Thompson, Marion L.); Fresno: Warrant, Fresno County, August 18, 1953, on charge of operating as a dealer without a license. On plea of guilty, was given 30-day suspended sentence, and placed on probation for two years. Closed.
- Thompson, Marion: Fresno: Warrant, Merced, County, September 29, 1953, on charge of operating as a dealer without a license. Defendant was arrested October 5, 1953, and entered a plea of not guilty before Judge Maushart. However, he was found guilty. Defendant made application for probation, which was granted. Sentenced to 90 days in jail; ordered to pay grower, and refrain from engaging in the produce business unless properly licensed. If probation violated, 90 days served in jail will not count. Closed.
- Turner, George J.; Merced: Warrant, Merced County, September 2, 1953, on charge of operating as a broker without a license. On December 28, 1953, defendant plead guilty. He filed an application for probation, which was denied. Defendant is serving 90 days in jail, and has been placed on probation for three years. Closed.
- Vanderput, Anthony W. and Robert; Venice: Warrant, Los Angeles County, September 29, 1954, on charge of operating as commission merchant, dealer, broker, cash buyer, and agent without licenses. Defendants plead not guilty at arraignment on October 1, 1954, and requested trial by court. Trial was held October 26, 1954, defendants sentenced to 180 days in county jail; suspended, except that they serve seven weekends starting on Fridays at 9 p.m., through Sundays at 9 p.m. Each man to pay the probation officer until all complainants have been paid in full. Defendants are not to violate their probation during a period of two years beginning November 30, 1954. Closed.
- Weaver, O. G.; Brawley: Warrant, Imperial County, July 27, 1953, and January 5, 1954, for violation of Section 476A, Penal Code. Two complaints filed alleging violation of Section 1273, Agricultural Code. Cases were consolidated with prosecution under Section 476A, Penal Code, involving issuing checks without sufficient funds. Defendant entered a plea of guilty and applied for probation. Defendant sentenced to state prison for the term prescribed by law. Sentence suspended, commitment withheld, and probation granted. Closed.
- Weintraub, Melvin; Salinas: Warrant, Monterey County, March 23, 1954, on charge of operating as a dealer without a license. Defendant fined \$50; placed on probation for two years; not to violate the Agricultural Code. A 30-day jail sentence was assessed, but was suspended if the probationary terms were met. Closed.
- Wiley, Fletcher (Fletcher Wiley Productions); Los Angeles: Warrant, Inyo County, December 9, 1954, on charge of acting as a dealer without a license. Pending.
- Wiley, Larry R.; Santa Rosa: Warrant, Sonoma County, November 10, 1954, on charge of operating as dealer and broker without licenses. Pending.
- Wittig, S. N.; Fresno: Warrant, Fresno County, August 2, 1954, on charge of operating as a cash buyer without license. Defendant appeared before Judge Meyers on August 3, 1954, and plead guilty. He received a 90-day suspended sentence; fined \$25, and placed on probation for one year. Closed.
- Womble, Juan; Salinas: Warrant, Monterey County, April 29, 1954, on charge of operating as a dealer without a license. Pending.

LICENSES CANCELED, REVOKED, SUSPENDED, DENIED FOR CAUSE, OR REINSTATED—1954

PRODUCE DEALERS ACT

- American Fruit Company; San Francisco: Dealer's and commission merchant's licenses revoked September 24, 1954, at 12.01 a.m. Violation of the Agricultural Code.
- Barnett, Samuel D.; El Centro: Dealer's and broker's licenses revoked as of 12 o'clock midnight, December 20, 1954. Violation of the Agricultural Code.
- Barnett, Samuel D.; El Centro: Application for agent's license to represent Nat Spector denied August 19, 1954. Failure to satisfy the director of his character, responsibility and good faith.
- Benigno, Jack; Fresno: Application for cash buyer's license denied November 17, 1954. Failure to satisfy the director of his character, responsibility and good faith.
- Bloom, Conrad; San Francisco: Cash buyer's license suspended December 1, 1954, to February 7, 1955. Violation of the Agricultural Code.

- Cal-Tom Distributing Company (Juan Womble, L. Hackett, H. Saldana) ; Gonzales: Cash buyer's license revoked January 13, 1954. Violation of Chapter 6, Division 6, Agricultural Code.
- Cavagnaro, Anthony J. ; Lathrop: Dealer's license suspended April 30, 1954. Violation of the Agricultural Code.
- Cavagnaro, Anthony J. ; Lathrop: Application for agent's license to represent E. M. Wolcott Company denied June 18, 1954. Previous violations of the Agricultural Code.
- Capital Hay and Grain Company (Joe Louis) ; Suisun: Dealer's license suspended for 30 days from September 20, 1954, to October 19, 1954. Violation of the Agricultural Code.
- Capital Produce Company (Sanjiro Betsuin) ; Los Angeles: Dealer's, broker's, and commission merchant's licenses revoked August 30, 1954. Violation of the Agricultural Code.
- Chorna, Fred: Application for agent's license to represent Morse & Chorna denied March 25, 1954. Previous violations of the Agricultural Code, and failure to make a showing of character, responsibility and good faith.
- Double AA Poultry Ranch (Arthur W. Derr) ; Baldwin Park: Dealer's license revoked April 20, 1954, at 11 a.m. Violation of the Agricultural Code.
- Ellingwood, H. C. ; Aromas: Dealer's license suspended March 1, 1954, to March 16, 1954. Violation of the Agricultural Code.
- Filbros Produce Company ; Niland: Dealer's license revoked October 19, 1954, at 12 o'clock noon. Violation of the Agricultural Code.
- Hackett, Lawrence: Application for agent's license to represent California Produce Distributing Company denied May 12, 1954. Previous violations of the Agricultural Code, and failure to satisfy the director of his character, responsibility and good faith.
- Harmatz, I. ; Artesia: Application for dealer's license denied November 23, 1954. Previous violations of the Agricultural Code.
- Himes Feed & Farm Supply (Harvey F. Himes and E. H. Martin) ; Oakdale: Dealer's license revoked February 19, 1954, because of bankruptcy.
- Hodgkins, Harold C. ; Chico: Applications for cash buyer's and broker's licenses denied October 14, 1954. Failure to make satisfactory showing of character, responsibility and good faith.
- Holland, K. Ray ; Fresno: Dealer's license revoked May 24, 1954, at 11.07 a.m. Violation of Section 1269(1) (b), Agricultural Code.
- King City Livestock Auction (Auddie R. Hall) ; King City: Dealer's, broker's and commission merchant's licenses revoked February 18, 1954. Violation of the Agricultural Code and insolvency.
- Kusanovich, John Frank (John F. and Rena Kusanovich) ; Watsonville: Application for dealer's license refused March 2, 1954, due to previous violations of the Agricultural Code, and failure to satisfy the director of his character, responsibility and good faith.
- LaMirada Wholesale Florist, Inc. ; Whittier: Application for cash buyer's license denied September 16, 1954. Failure to make sufficient showing of financial responsibility.
- Lancieri, Vincent ; Santa Clara: Application for broker's license denied November 12, 1954. Previous violations of the Agricultural Code, and failure to satisfy the director of his character, responsibility and good faith.
- Landrus, L. C. ; Santa Rosa: Agent's license to represent Farmers Bean and Grain Company suspended April 26, 1954, to May 8, 1954. Previous violations of the Agricultural Code.
- Landseadal, Gustave A., Dinuba: Application for renewal of dealer's license denied July 8, 1954. Failure to satisfy the director of his character, responsibility and good faith.
- Lopes, Joaquin N. ; San Jose: Dealer's license suspended for a period of 30 days effective November 9, 1954, at 10.45 a.m. Violation of the Agricultural Code.
- LuVel Gardens (John W. and Velma N. Myers) ; Fresno: Application for cash buyer's license denied January 20, 1954, because of previous violations of the Agricultural Code.
- Mazzuca, Italiano and Carbone (Pete & Carl Mazzuca, P. & G. Italiano, & Chas. Carbone) ; San Jose: Cash buyer's license revoked May 4, 1954, at 11 a.m. Violation of the Agricultural Code.
- Mira Loma Egg Farms (Ben S. Cohen) ; Los Angeles: Dealer's license revoked March 8, 1954. Violation of the Agricultural Code.

- National Fruit Growers, Inc.; El Centro: Dealer's and broker's licenses revoked July 9, 1954. Violation of the Agricultural Code.
- Northwest Sales Company; San Francisco: Broker's license suspended February 15, 1954, to the date of expiration, August 28, 1954. Violation of the Agricultural Code.
- Parker, Lyman A.; Santa Maria: Broker's license suspended February 24, 1954, to the date of expiration, September 26, 1954. Violation of the Agricultural Code.
- Pioneer Poultry (Richard Fred Lawrence); Watsonville: Dealer's license revoked February 17, 1954. Violation of the Agricultural Code, and insolvency.
- Rancho Cloverita Poultry Company (Bernard Mattison and Louis R. Friedman); Van Nuys: Dealer's license suspended for 30 days from September 13, 1954, to October 12, 1954. Violation of the Agricultural Code.
- Ranch 2 You Egg Company (Geo. S. Dordigan); Venice: Dealer's license revoked September 23, 1954, at 11.30 a.m. Failure to pay growers.
- Regina Olive Products Company; San Francisco: Dealer's license revoked February 15, 1954, because of insolvency.
- Samjo, Inc.; Bakersfield: Dealer's license suspended January 14, 1954, to June 22, 1954. Violation of the Agricultural Code.
- San Jose Fruit & Produce Distributors (Frank J. Corica); San Jose: Dealer's license suspended June 3, 1954, at 11.15 a.m., to May 11, 1955, because of insolvency.
- Spector, Nat: Application for agent's license to represent Sam D. Barnett denied August 18, 1954. Failure to satisfy the director of his character, responsibility and good faith.
- Stingone, D.; Fresno: Agent's license to represent Bianco Packing Company, Inc., revoked November 8, 1954. Violation of the Agricultural Code.
- Supnet, Sam; Los Gatos: Cash buyer's license revoked May 4, 1954, at 2.15 p.m. Violation of the Agricultural Code.
- Thompson, Bill Lee; Fresno: Application for cash buyer's license denied April 13, 1954. Previous violations, and failure to satisfy the director of his character, responsibility and good faith.
- Toledo, M. S.; Los Angeles: Dealer's, broker's, and commission merchant's licenses revoked November 19, 1954, at 11.20 a.m. Violation of the Agricultural Code.

PROCESSORS LAW

- Campagnola Food Products, Inc.; Gardena: Processor's license revoked September 29, 1954. Failure to pay growers.
- Miller Alfalfa Company (Glenn L. Miller); Seeley: Processor's license suspended May 25, 1954, to the date of expiration, December 31, 1954. Violation of the Agricultural Code (Section 1300.4a(b)).
- Regina Olive Products Company; San Francisco: Processor's license revoked February 15, 1954, because of insolvency.
- Sanguinetti, Melvin S.; Application for agent's license to represent Italian Swiss Colony denied September 2, 1954. Previous violations of the Agricultural Code, and failure to satisfy the Director of his character, responsibility and good faith.
- Yosemite Creek Company; Merced: Processor's license revoked March 2, 1954, because of insolvency.

BUREAU OF MARKET NEWS

GEORGE K. YORK, *Chief*

Price changes for agricultural products were irregular during 1954. On a national basis, prices for livestock and livestock products declined considerably while most crops gained slightly to moderately. Losses more than offset the gains, and the general level continued the downward trend which began in 1952. The national index of prices received by farmers for agricultural products in general averaged 250, or eight points below 1953 and 38 points below 1952. The December average of 239 was 15 points below December, 1953, and 30 points below December, 1952. It represented the lowest monthly average level since February, 1950.

Nationally, cash receipts from farm marketings totaled 30 billion dollars in 1954, 5 percent below 1953. The decline was due to lower average prices since the total volume of farm marketings remained practically unchanged. Realized net income from farming dropped 10 percent to 12 billion dollars, since there was only a slight reduction in farm expenses. The ratio of indexes between prices received and prices paid by farmers averaged 89 in 1954, the lowest since 1941. Paralleling the national trend, California's cash receipts from farm marketings declined to slightly under 2.5 billion dollars, 4 percent below 1953. California again ranked first in terms of this measure, followed by Iowa, Illinois, and Texas.

The value of U. S. agricultural exports in the fiscal year ending June 30, 1954, increased slightly over the previous fiscal year but was well below the record established in 1951-52 following the Korean outbreak. Exports of farm commodities continued to increase moderately during the fore part of the 1954-55 fiscal year in response to an active foreign demand, improved financial position which made the demand effective, continued large scale U. S. aid and other foreign expenditures, and more competitive prices for a number of U. S. commodities.

Significant market developments, both in California and in the United States, were price declines in dairy products, poultry, eggs, and hogs; and the exportation of California citrus to Great Britain, Ireland, and Norway for the first time in postwar years. Nationally, cash receipts from all major livestock items were below 1953 except for hogs, cattle, and calves. Receipts from hogs were practically the same as 1953 while receipts from cattle and calves were up 5 percent due to larger marketings. The largest decline in cash receipts in the livestock group was a 21 percent drop for chickens, excluding broilers. Marketings of eggs were up 5 percent but prices dropped 23 percent.

California dairy and poultry production exceeded 1953 in nearly all commodities. Population growth provided a ready market. Dairy products prices averaged below 1953, partly reflecting lower support prices. Egg prices averaged well below 1953 because of large production both in California and nationally. A heavy volume of eggs was shipped out of the State. Poultry prices averaged the lowest in several years. Competition was strong from southern states. California turkey prices were the lowest in 13 years though production in California was below 1953.

Orderly marketing of cattle and the excellent demand for beef contributed to fairly stable price levels. Cattle feeding operations were increased significantly in response to the demand. Stocker and feeder cattle prices reflected the market stability of fed cattle. Packers competed with stocker and feeder buyers for slaughter calves and vealers. Hog production was only slightly below 1953 though the number of hogs on California farms on January 1, 1954, was the smallest of record. The spring lamb crop was 7 percent above 1953. Top prices were received in the spring when the bulk of the early lambs were marketed. California led all states in the slaughter of cattle and lambs. Slaughter of cattle increased 3 percent, calves 11 percent, and sheep and lambs 4 percent over 1953, while slaughter of hogs decreased 3 percent. Wool trading was characterized by moderate activity the first half of 1954 and dullness much of the remainder due to uncertainty concerning price support levels for 1955. Prices generally were steady, averaging 1 cent below 1953.

California field crop production set a new record high in 1954 despite governmental control of cotton and wheat acreage. Also despite control, cotton again out-ranked all other California crops in value by a wide margin. Production of barley set a new record high and production of corn expanded sharply. Increased produc-

tion of alfalfa hay found a ready outlet but at prices slightly under 1953 and far below 1952 and 1951. Prices were under 1953 for all California field crops except corn, wheat, cotton, and most field seeds. Prices for many field crops again were largely determined by governmental support programs. Prices for most supported commodities were slightly to moderately below support. Cattle feeders used barley extensively because of its low price in relation to corn. Usage of feedstuffs remained heavy because of the large numbers of meat animals, dairy cattle, and poultry. Prices averaged below 1953 for most feedstuffs and concentrates. Exceptions were soybean meal, cottonseed meal, and meat scraps.

Market prices for fruits and vegetables again were irregular. Average prices to growers were above 1953 for those fruits with smaller production or better quality, but generally below for those with larger productions. Exceptions were pears and freestone peaches. Prices for the record large crop of Bartlett pears averaged 3 percent above 1953 and prices for the heavy crop of freestone peaches averaged 8 percent above. The small dried apricot production brought the highest average prices of record. Abnormal heat and unseasonable rains reduced the production or lowered the quality of several major fruits and affected their prices. The importance of the strawberry industry continued to increase. Quick freezing set a new record high. Fresh usage was about the same as in 1953. Prices averaged above 1953.

Vegetable and melon prices generally were slightly below 1953 even though the tonnage was less. Lettuce ranked first among the vegetables in acreage and value and tomatoes second. Containers and handling methods continued to change, with fiberboard containers and prepackaging more popular.

Demands for the services of this bureau continued to increase as growing recognition of the need for open exchange of timely information placed additional emphasis on market news. This increased emphasis was particularly accentuated in California where a major part of the agricultural production is of a specialty nature which must be distributed quickly to distant points throughout the United States and neighboring countries. The growing population in California creating a greater need for broader local market coverage, the shift from terminal market trading to country trading, and rapid changes in transportation and packaging practices were highlights of the year affecting demand for market news. While striving to meet full industry needs, it proved possible to fulfill only a part of the new requests.

A new fruit and vegetable office was opened at Stockton in August in response to industry request, and made possible by enabling state legislation. This office was designed to provide shipping point market coverage of tomatoes, celery, potatoes, onions, asparagus, sweet potatoes, and other important fruits and vegetables of the Delta and northern San Joaquin Valley areas. Concentrated market coverage of Tokay grapes was continued through the operation of a seasonal office in Lodi.

The Fresno dairy and poultry office continued a specialty program of weekly turkey slaughter at San Joaquin Valley plants similar in nature to the wine, grape crush, and strawberry freezing census conducted by the Fruit and Vegetable Market News Service. In Dairy and Poultry Market News activities of the nation, this report is unique to the Fresno office. Slaughter at the plants covered is equivalent to nearly two-thirds of the California turkey production.

This report summarizes market prices, conditions, and developments during 1954 of the agricultural products and markets of California for which Federal-State Market News Service is provided. Practically all products of commercial importance and all key market centers and areas of the State were reported. More detailed information is available from daily, weekly, and other periodic reports of this service, copies of which are available upon request.

DAIRY AND POULTRY PRODUCTS

The dairy and poultry industries continued to find a ready market for their products in California in 1954. Ever increasing population continued to provide an impetus for stepped up production which exceeded 1953 on nearly all commodities. Prices for dairy products averaged below 1953, partly in reflection of reduced support prices. Prices for eggs reversed the usual situation and were lower in the fall than in the early spring. For the year they averaged well below 1953. A heavy volume of California eggs was shipped out of the State during 1954. Prices for all major classes of poultry were low. Producer prices for fryers and hens averaged the lowest in several years. California fryers met strong competition from truck shipments from southern states. Market supplies of hens were plentiful as producers

culled or sold flocks due to low egg prices. Turkeys also were low, prices averaging the lowest in 13 years. Though California production was 1 percent below 1953, national production established a new record high.

Eggs

California poultrymen again increased their egg production for 1954. This trend in increased production has continued for the past several years as demand for eggs has continued to accelerate with population growth. It is estimated that a record 4.2 million eggs were produced compared to 3.7 million in 1953. The output of chick hatcheries in the State also increased. It totaled 106.5 million chicks hatched compared with 101.5 million in 1953.

A rather unusual egg marketing situation was recorded during 1954. The normal price pattern of lower prices in the spring, with a gradual increase from summer to early winter months, did not occur. Prices in the fall are usually higher and production is lower. This year prices were lower in the fall than in early spring, and many estimates indicated heavier production in fall and early winter than the spring. Egg prices were favorable the first quarter and resulted in producer plans for heavy pullet replacement during the year. Egg supplies, however, were more plentiful in the spring and local and national price structures were low. Some pullet curtailment was noted when early summer indicated little hope for a favorable egg-feed ratio, but it was too late to affect fall production. Instead of egg prices normally moving higher from August to the end of the year, each month prices progressively declined on large eggs. Mediums and smalls gained in price in November and December because of strengthened demand from adjoining states and shift in production to mostly large eggs. A heavy volume of local eggs was shipped out of California into Arizona, New Mexico, Nevada, Louisiana, Mexico, and the Islands. During the year prices at Los Angeles ranged from 12 to 20 cents below 1953, and the yearly average from 14 to 17 cents below last year.

The level and trend of prices in the Fresno area of the San Joaquin Valley are depicted by the following monthly and annual averages:

EGGS—MONTHLY AVERAGE PAYING PRICES IN SAN JOAQUIN VALLEY 1954 AND 1953

(Cents per Dozen, F.O.B. Ranch, Grade A)

Month	Large		Medium		Small	
	1954	1953	1954	1953	1954	1953
January.....	51.45	51.38	48.30	48.55	41.50	42.50
February.....	46.16	44.53	43.89	42.55	40.13	37.63
March.....	38.85	49.18	36.11	47.18	31.37	39.80
April.....	38.43	49.00	34.18	47.23	28.66	39.57
May.....	37.48	50.43	30.43	47.50	21.63	37.02
June.....	37.09	52.93	29.14	49.14	19.50	34.34
July.....	43.71	55.50	33.60	48.59	19.98	34.04
August.....	40.32	59.67	29.32	51.43	19.73	33.36
September.....	40.14	60.43	25.86	52.12	17.55	33.50
October.....	37.02	60.82	23.12	50.32	15.95	36.68
November.....	35.90	53.45	26.60	45.92	23.10	38.11
December.....	32.86	53.77	30.77	48.70	28.50	39.77
Yearly averages.....	39.95	53.42	32.61	48.27	25.63	37.19

Poultry

The year 1954 was one of low prices for all major classes of poultry. Prices received by producers for chicken fryers and hens were the lowest in a number of years. Fryer production in California increased about 5 percent over the previous year for a record crop. Caponette fryers were produced in greater volume in Southern California. A plentiful supply of hens was available during the year as flocks were closely culled or sold due to the extremely low egg prices.

Producers in the *San Joaquin Valley* received an average of 3½ cents per pound less for fryers than in 1953. The monthly average price was between 24 and 28 cents per pound January through October, and declined to less than 21 cents per pound in December. Prices were the highest during the summer months when con-

sumer demand is usually greatest. It became increasingly evident during the year that truck shipments of fresh processed fryers from the southern states were a big competing factor for the California market. Lower processing costs in the southern states more than offset the freight charges to California markets.

Light type chicken hens (mostly White Leghorns) averaged 6 cents less and heavy type hens 5 cents less in the San Joaquin Valley than in 1953. A heavy supply was available from the record crop of layers as low egg prices increased culling and flock sales. The slow chick demand the last half of the year also caused some breeder flocks to be cut or sold. Low chicken fryer and turkey prices were also factors contributing to the lowest hen prices in recent years. An active demand for hens prevailed most of the year due to the low prices. Large quantities were used in the manufacture of food products, sold to the Army Quartermaster, and sold fresh processed into retail channels.

The level and trend of chicken prices in the San Joaquin Valley are depicted by the following monthly and annual averages.

LIVE POULTRY—MONTHLY AVERAGE PAYING PRICES IN SAN JOAQUIN VALLEY
1954 AND 1953

(Cents per Pound, F.O.B. Ranch)

Month	Fryers		Light type hens		Heavy type hens	
	1954	1953	1954	1953	1954	1953
January.....	27.05	30.98	15.75	18.88	24.95	23.62
February.....	24.63	29.53	17.50	21.73	25.11	26.34
March.....	24.61	29.66	18.85	22.66	26.74	28.61
April.....	24.98	28.16	15.75	22.91	25.20	29.27
May.....	26.31	27.11	13.95	22.93	21.20	28.95
June.....	27.25	25.08	12.41	19.77	18.34	25.09
July.....	26.36	28.15	11.98	19.48	16.71	23.44
August.....	27.72	30.21	12.32	20.05	17.68	23.67
September.....	24.50	30.43	10.71	18.48	15.98	23.00
October.....	24.07	30.34	9.88	17.50	14.52	23.05
November.....	23.14	28.74	10.54	15.68	15.78	23.50
December.....	20.89	25.80	11.25	14.77	18.00	23.57
Yearly average.....	25.13	28.68	13.41	19.57	20.02	25.18

The *Los Angeles* poultry prices averaged 4-5 cents below 1953 on young chickens and 5-6 cents below on hens. Increased fryer production in commercial areas throughout the nation had a direct influence on the local market. As these other areas sought additional market outlets for their fryers, the local trade had to compete with liberal offers of more favorably priced processed, ice packed fryers throughout most of the year. Even in periods of limited local production, the market undertone was weakened as one or more areas freely offered fryers on the *Los Angeles* market. This situation caused emphasis to be placed on more efficient production and processing so that local producers and processors might survive this competition. Though prices averaged lower, the volume of live and dressed poultry moved through local channels showed an increase over the previous year. Caponette fryers continued to have a higher consumer acceptance and, though their production did not increase in proportion to that of regular fryers, caponettes still commanded a higher price. Due to the expedience of handling and high consumer acceptance, the majority of fryers were marketed either processed whole body or cut up.

The hen market reflected both the low egg-feed ratio and competitively priced fryers throughout most of the year. Culling of flocks was liberal as egg prices remained near and below estimated cost most of the year. Many processors were forced to freeze surpluses during these periods and then freely offered these surpluses as outlets opened. Thus hens, either fresh or frozen, were in greater supply than demand most of the year. The movement of processed hens out of State was more noticeable than in previous years. Also, a larger volume of hens from the local area moved into such channels as canneries and frozen chicken pies. Because of improved consumer acceptance and more rapid merchandising, most city processors have taken advantage of city, county, or federal health inspection services and the volume of processed whole body and cut up hens continued to increase over previous years.

A comparison of the annual average chicken prices the past several years at the Los Angeles market is depicted below.

LIVE POULTRY—ANNUAL AVERAGE PRICES DELIVERED AT LOS ANGELES
1950-1954

(Cents per Pound)

	1954	1953	1952	1951	1950
Broilers.....	24.90	28.20	29.30	28.61	28.55
Fryers.....	26.76	*31.48	*32.60	*30.80	*30.76
Caponettes 3½-4½ lb.....	30.04	34.43	35.58	33.88	34.25
Hens, light type.....	14.75	*20.00	*18.98	*24.19	*19.64
Hens, heavy type.....	22.43	28.63	26.79	32.21	28.40

* Reported in two weight classifications but averaged together for comparison.

Turkeys

The 1954 turkey marketing season was characterized by the lowest prices in 13 years. Nationally, production was at a record level. California continued the nation's largest producer, though the state crop was one percent below 1953. Production costs were slightly below 1953 but still relatively high. The California crop consisted of 89 percent heavy breeds and 11 percent light breeds, or about the same as in 1953. There was no government purchasing program to help stabilize prices. Many flocks were marketed sooner than usual and at lighter weights than planned.

Heavy type turkeys were marketed throughout the year. Movement was light the first four months, then increased in May and June as the breeder stock was sold. Prices averaged 1-4 cents below the year previous.

New crop heavy type young turkeys started moving in June with hens 33-34½ cents and toms 27 cents at ranch. By July the volume had increased sharply and prices declined to a level that saw little change the rest of the year. Prices received by growers averaged about 5 cents per pound less than 1953. Trading was rather dull much of the season. The record crop discouraged speculative buying. Many large chain stores and the Army Quartermaster did buy processed turkeys during the summer and early fall for their holiday requirements. This was a stabilizing factor in marketing the State's large crop of early turkeys.

The light breed turkeys also were marketed throughout the year, though mostly April through December. Practically all of these were sold as turkey fryers weighing usually between 6 and 10 pounds. Prices paid to producers averaged about 4 cents per pound under 1953. Demand was slow due to the limited California trade and low eastern prices.

The level and trend of turkey prices in the San Joaquin Valley are depicted by the following monthly and annual price averages.

TURKEYS—MONTHLY AVERAGE PAYING PRICES IN THE SAN JOAQUIN VALLEY
1954-55 AND 1953-54

(Cents per Pound F.O.B. Ranch)

Month	Heavy type	Young hens	Heavy type	Young toms	Small type	Turkey fryers
	1954-55	1953-54	1954-55	1953-54	1954-55	1953-54
May.....	---	---	---	---	30.18	---
June.....	---	---	---	---	27.29	---
July.....	28.10	---	24.17	---	26.44	---
August.....	27.52	32.01	24.90	30.05	26.00	31.47
September.....	28.04	32.44	23.43	29.10	26.36	31.00
October.....	29.18	34.52	22.38	29.07	27.99	31.93
November.....	31.19	36.07	23.23	28.49	31.31	33.00
December.....	31.19	40.04	22.90	29.23	---	33.00
January.....	---	---	22.49	30.23	---	32.40
Unweighted average.....	29.20	35.02	23.26	29.36	28.50	32.13

The low prices all year stimulated a good movement of processed turkeys into consumer channels. Distributors extended themselves to sell hens and light toms, and though a 9 percent greater crop was raised in the United States, cold storage holdings at the end of the year were about the same as a year earlier.

The volume of turkeys moved into consumer channels in Southern California exceeded all previous years. Advertising and attractive consumer prices accounted for much of the volume moved. Another prime factor was the increased number of gift packaged birds given employees by companies in this area. These gift packages have facilitated the movement of large volumes direct to consumers.

Several trends in the marketing of California turkeys again were evident in 1954. The shift to processing turkeys ready-to-cook and away from the old style of processing with head, feet, and viscera intact was virtually completed during the year. Estimates indicate about 5 percent or less of the birds processed in the San Joaquin Valley were the undrawn New York dressed style. The trend toward a longer and earlier marketing season continued. The largest volume ever processed during the summer months was recorded during the 1954 season. November continued the peak month.

A comparison of the volume of turkeys processed by San Joaquin Valley plants each month shows the approximate movement of the California crop.

**TURKEYS PROCESSED BY SAN JOAQUIN VALLEY PLANTS
1954 AND 1953**

Month	Mature turkeys		Turkey fryers		Total—All classes	
	1954	1953	1954	1953	1954	1953
January.....	106,896	183,849	13,009	29,265	119,905	213,114
February.....	41,006	40,531	4,100	30,669	45,106	71,200
March.....	12,160	36,296	5,000	39,751	17,160	76,047
April.....	40,324	79,239	60,198	62,346	100,522	141,585
May.....	214,579	201,709	73,602	121,588	288,181	323,297
June.....	220,872	212,561	95,930	142,811	316,802	355,372
July.....	400,623	314,989	60,293	106,482	460,916	421,471
August.....	569,191	545,040	62,833	100,541	632,024	645,581
September.....	780,858	748,457	102,414	117,493	883,272	865,950
October.....	868,360	1,005,223	88,600	138,699	956,960	1,143,922
November.....	1,151,263	1,174,903	42,628	118,963	1,193,891	1,293,866
December.....	986,674	1,009,517	43,491	51,408	1,030,165	1,060,925
Totals.....	5,392,806	5,552,314	652,098	1,060,016	6,044,904	6,612,330

Dairy Products

California markets for dairy products continued to expand in 1954. Except for fluid milk, California remained a deficit area and imports from other states were necessary. Milk production on California dairy farms increased approximately 6 to 7 percent over 1953 according to early indications. Usage of fluid milk and cream and the manufacture of butter and cheese increased, while manufacture of ice cream and condensed milk decreased. Receipts of butter and cheese at San Francisco and Los Angeles increased over 1953, but again included large amounts of government supplies.

Governmental support prices for dairy products, mandatory under federal law, again influenced commercial prices. Support was reduced April 1 from 90 percent of parity to 75 percent. Support prices on cheese and dry milk were raised one cent effective July 12. Price support again was implemented through CCC purchases of butter, cheddar cheese, and nonfat dry milk solids from manufacturers and handlers on an offer and acceptance basis. Purchase prices, basis San Francisco, with differentials for other delivery points, were:

	Jan. 1-Mar. 31 Cents per pound	Apr. 1-July 11 Cents per pound	July 12-Dec. 31 Cents per pound
Butter—Grade A	66½	57½	57½
Butter—Grade B	64½	55½	55½
Cheddar cheese	37	32½	33½
Dry milk—spray	16	15	16
Dry milk—roller	14	13½	14½

California continued to be an importing market for butter and cheese. The amounts imported from other states, as measured by available receipt data for Los Angeles and San Francisco covering both government and commercial supplies, increased slightly over 1953 on cheese and very slightly on butter. Combined receipts of 79,569,000 pounds of butter at the two markets, including receipts from California points, were well above the previous eight years and around prewar levels. Receipts from California points were the greatest since 1942 and only 20-25 percent below prewar amounts. They represented 34 percent of the total, against nearly half in the immediate prewar period. Other western states furnished 45 percent and other states 21 percent of the total.

Combined receipts of 59,326,000 pounds of cheese were 4 percent over 1953 and the heaviest of record. Receipts from California points were slightly above six of the previous seven years but below earlier years. They represented 6½ percent of the total, or slightly more than in 1953. Other western states supplied 49 percent and other states 44½ percent of the total.

National per capita consumption of butter increased from 8.6 pounds in 1953 to 9.0 pounds in 1954, but remained far below the average of 16.9 pounds from 1935 to 1939. Consumption of margarine increased from 7.9 pounds to 8.0 pounds, against only 2.8 pounds in 1935 to 1939. Consumption of cheese continued to increase and was estimated at 7.6 pounds to tie the record back in 1950. It was 5.5 in 1935 to 1939.

Dairy products markets nationally averaged barely steady the first quarter of 1954, and had a weak tone near the close. Prices declined in April reflecting the reduced support prices, then held generally steady at the lower level through the second quarter. Markets ranged steady to firm in the third quarter. Sales to CCC decreased. Butter prices advanced sharply in September then declined in October. Other products showed only minor price changes. Prices were mostly steady to firm the remainder of the year. Storage stocks were at or near record levels from July on. Sizeable quantities of CCC stocks of cheese and butter were resold to the commercial trade in October.

California markets generally followed the national trend. The level and trend of prices for butter and cheese are depicted in the following table:

**BUTTER AND CHEESE—MONTHLY AVERAGE WHOLESALE PRICES AT SAN FRANCISCO
1954 AND 1953**

(Cents per Pound)

Month	Butter						Cheddar cheese, Grade A			
	Grade AA		Grade A		Grade B		Loaf		Single daisies	
	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953
January.....	67.00	69.95	66.75	69.71	64.50	67.33	43.50	48.93	40.15	44.71
February.....	67.00	70.89	66.75	69.97	64.50	67.00	43.50	47.92	39.50	44.00
March.....	66.74	71.00	66.47	70.00	64.30	67.00	43.28	46.75	39.07	43.25
April.....	59.66	68.11	59.30	67.50	57.70	66.11	39.75	46.00	37.25	43.00
May.....	58.00	66.54	57.75	66.54	55.50	65.50	41.12	46.00	37.08	43.00
June.....	58.00	66.98	57.75	66.98	55.50	65.30	40.25	44.55	36.00	42.33
July.....	58.64	67.00	58.50	67.00	56.02	65.00	40.25	42.39	36.42	40.84
August.....	59.25	67.43	59.09	67.29	57.00	65.00	40.25	42.50	36.88	39.71
September.....	59.79	68.02	59.63	67.76	57.24	65.00	40.96	42.50	37.87	38.96
October.....	61.00	69.07	61.00	68.80	58.00	65.82	41.43	43.09	38.00	40.45
November.....	61.02	68.78	60.96	68.49	58.60	66.95	42.50	43.50	38.00	40.50
December.....	62.00	67.47	61.29	67.07	59.67	65.39	41.67	43.50	37.50	40.50
Yearly average....	61.51	68.44	61.27	68.09	59.04	65.95	41.54	44.80	37.81	41.76

LIVESTOCK, MEAT AND WOOL

Meat consumption in the United States reached an all-time high influenced by a continued high level of economic activity. Significant increases in cattle-feeding operations in California over the previous year's record numbers indicate that California consumers shared in the national trend toward larger meat consumption, with continued emphasis on beef. This increased consumption contributed to a considerable

degree to the market stability of cattle, calves, and lambs, the major livestock species produced in California. The volume of cattle to be marketed during the year and the comparatively small margin between feeder and fat cattle prices made it extremely important for the producer to market his stock in an orderly fashion. The favorable position of the early lamb producer in California was again demonstrated as top prices for lambs were recorded in the State during April, May, and June when the bulk of early lambs were being marketed.

California, with the largest number of slaughtering plants in any state in the nation, continued to lead all states in the slaughter of cattle and lambs. According to indications at the year's end, cattle slaughter increased 3 percent over 1953, calf slaughter 11 percent, and sheep and lamb 4 percent. Hog slaughter, however, decreased about 3 percent from 1953.

LIVESTOCK—AVERAGE PRICES AT CALIFORNIA TERMINAL MARKETS
MONTHLY, 1954: ANNUAL, 1949-1954

(Dollars per 100 Pounds)

Month	Los Angeles					South San Francisco
	Steers choice 900-1,100 lbs.	Cows commercial all weights	Cows utility all weights	Calves choice 500 lbs. down	Hogs choice 180-240 lbs.	Lambs ^a choice and prime
1954						
January.....	\$24.16	\$14.69	\$12.66	\$19.80	\$26.36	\$20.81
February.....	23.13	14.68	12.74	20.19	26.65	21.00
March.....	23.12	15.28	13.46	21.38	27.44	22.61
April.....	23.92	15.56	13.86	22.12	28.40	24.50
May.....	24.83	15.98	14.08	22.73	27.31	23.94
June.....	24.40	15.36	13.17	20.93	25.82	23.10
July.....	24.16	13.90	11.90	19.04	23.40	21.11
August.....	24.04	13.67	11.96	18.98	23.75	19.38
September.....	24.15	13.31	11.74	18.93	21.65	19.00
October.....	23.73	12.96	11.19	18.71	20.56	19.06
November.....	22.88	12.44	10.77	18.20	20.38	19.50
December.....	23.43	13.44	11.24	19.15	19.58	19.70
Calendar Year						
1954.....	23.83	14.27	12.40	20.01	24.28	21.14
1953.....	23.88	15.25	13.37	20.42	23.90	21.84
1952.....	32.44	22.66	20.29	31.22	22.74	26.69
1951.....	36.30	28.15	25.53	36.31	22.76	33.22
1950.....	29.14	22.82	19.49 ^b	29.35	21.27	26.63
1949.....	25.38	18.48	15.48 ^b	25.35	21.47	24.48

^a Spring lambs April to September, woolled lambs remainder of year.

^b Utility and Cutter combined.

Cattle

A record volume of cattle was marketed from California ranges and feed lots according to preliminary indications. Several loads of fed cattle were shipped from California feed lots to midwest points toward the end of 1954 which is in contrast with the usual in-shipment of fed steers and heifers. Contrary to the situation nationally, the bulk of the cattle sales in California again were direct from feed lots to packing plants or cattle buyers as marketing practices here tend toward decentralization. Factors contributing to decentralization of marketing are the large number of packing houses located in or near the consuming areas of the State, and the development of large commercial feed lots within major feeding areas, permitting buyers to view many hundreds of cattle within a comparatively small radius.

Orderly marketing of cattle and an excellent demand for beef contributed to fairly stable price levels in the cattle industry throughout the year. Average monthly price fluctuations on the Los Angeles market for choice steers were confined to slightly less than \$2.00 per cwt. from the high average of \$24.83 in May to the low of \$22.88 in November. In spite of larger inventories than a year earlier, a strong sense of confidence in the ability of the cattle grower to successfully market his product was shown by the demand for stocker and feeder cattle and by the extremely high level of feeding at California feed lots. Stocker and feeder cattle prices reflected the market stability of fed cattle. Average prices on good feeders at Los Angeles varied from a

high of \$21.37 in May to a low of \$18.55 in November. This compared with a high of \$22.25 in January, 1953, and a low of \$16.29 in September, 1953.

Slaughter calves and vealers found a good demand throughout the year as packer buyers competed freely with stocker and feeder buyers. California packers and wholesalers found it necessary to secure a large part of their veal supply from other states during the winter months.

Hogs

Hog production in California declined slightly compared with 1953 even though the national production increased. The 452,000 hogs on California farms on January 1, 1954, were the smallest of record. The hog industry remained of minor importance in the State when compared with other livestock. California production amounted to about 35 percent of the hogs slaughtered in the State. Hog prices advanced moderately early in the year to reach a peak average of \$28.40 in May at Los Angeles. They then declined steadily until the end of the year, and averaged \$19.58 during December.

The extensive program carried on by the state and federal veterinarians to eradicate vesicular exanthema in hogs was of prime importance to growers throughout the State and Nation. By the end of 1954, nearly all garbage feeders operating in California were cooking garbage to abide by state regulations. During the year many areas and counties were lifted from quarantine so that by the end 33 counties were declared free of the disease and in many of the remainder the quarantine applied only to certain ranches or small local areas.

Lambs

Lambs pastured on alfalfa in the Imperial Valley started moving to market the early part of January, 1954. Prices for Choice No. 1 and 2 pelt old crop lambs were largely \$19.00-19.50, a few loads upward to \$20.00 late in the month. The bulk of the supply was sold in February and March at \$19.00-20.00, but quite a few sales in March were at \$20.50-21.00, including resales on many lambs bought earlier. The supply of old crop lambs in this area in January was estimated at 214,000 head. Marketing was orderly and weights for the season ranged largely 110 to 118 pounds. The trade estimated that about 25,000 head moved East by rail with the bulk of the remainder consumed in California.

Selling of spring lambs started about the same time as in 1953. First sales were made in the Sacramento Valley. Most sales were on contracts for later delivery, in contrast with 1953 when sales were mostly for immediate delivery. Opening contracts were \$21.00-22.00. Prices strengthened after the first week of trading, and most sales for the season were \$23.00-23.50, some upward to \$24.00 and above toward the close of the season. Contracts generally specified that buyer receive all fat lambs weighing 60 pounds or over after an overnight stand, with delivery time mostly at grower option. The comparatively dry weather in the winter months was favorable for the lamb crop in the Sacramento Valley but tended to restrict growth of range feed in the San Joaquin Valley and delayed movement to ranges in that area.

The eastbound shipping of spring lambs started the second week in April and continued through the last week in June with total live out-shipments numbering 188,000 head. Out-of-state shipments of dressed lamb started around April 20th and continued into June. A trade survey indicates that about 60 carloads or 39,000 carcasses moved by express, largely to the Atlantic seaboard. Also small numbers were moved to Northwest and Intermountain cities by truck. Out-of-state carcass movement in 1954 was nearly five times that of 1953. Lower express rates were a factor.

North Coast lambs started to arrive in volume on the South San Francisco market early in June. Weather conditions encouraged an earlier-than-usual movement to market. Most Choice and Prime Spring lambs arriving in mid-June sold at \$24.00. North Coast and mountain lambs moved in volume through the South San Francisco market in mid-July, with most Choice and Prime woolled spring lambs bringing \$20.50-21.50. Prices declined in August and September, dropping to \$18.50 and \$19.00. The California Crop and Livestock Reporting Service estimated the spring lamb crop as 7 percent above 1953.

Meats

Wholesale beef had three distinct price phases in 1954. Based upon Choice carcasses, prices declined the first four months to the lowest level of the year. In this

period supplies were drawn chiefly from feed lots in nearby California areas. For the first time on record, Choice beef sold at midsummer at the highest point of the year. Prices receded the last four months of the year to about the levels of the first quarter. The average price for Choice 600-700-pound steer carcasses was \$40.34 for the year, compared with \$40.62 in 1953 and \$54.19 in 1952. Due to curtailed armed forces buying of boneless heavy beef, weights over 750 pounds lacked a stable demand. Some Choice 800-900-pound beef was shipped to the Atlantic Coast for the first time on record though shipments were not too extensive. Most other grades of steer, heifer, and cow beef sold at considerable discounts below Choice. A new development was the establishment of numerous cow beef boning plants with the aim of distributing boneless Canner, Cutter, and Utility cow cuts on a national basis.

Average prices of Good skin-off 200-300-pound calf carcasses were relatively strong the first five months of 1954. Supplies at that time were at a seasonal minimum. After mid-June, the prices declined the remainder of the year. The yearly average price was \$36.17 compared with \$37.37 in 1953 and \$53.13 in 1952. Choice 40-50-pound lamb carcasses averaged \$42.56 compared with \$43.72 in 1953 and \$53.35 in 1952. A reduction in express rates effective March 17, 1954, opened the way for an expanded movement of dressed lambs to the Atlantic Coast. Dressed shipments to out-of-state points began April 20 and continued into June.

Much of the fresh pork cuts and smoked meats consumed in California originate in the Western Corn-belt area. Prices on important cuts were relatively high throughout the year.

The supply of locally produced pork cuts was light. For the first nine months supplies were well below normal, but the last quarter witnessed increased supplies and somewhat more favorable price levels for consumers.

The following table presents monthly average wholesale prices of representative classes and grades of meats in the San Francisco Bay area for 1954, together with annual average prices for the past five years:

MEATS—AVERAGE PRICES IN SAN FRANCISCO-OAKLAND BAY AREA
MONTHLY, 1954: ANNUAL, 1949-1954

(Dollars per 100 Pounds)

Month	Beef		Calf	Lamb	Pork cuts		
	Steer choice 600-700 lbs.	Cow utility all weights	Good skin-off 200 lbs. up	Choice grade 40-50 lbs.	Loins fresh 10-12 lbs.	Hams smoked skinned 12-16 lbs.	Bacon sliced 1 lb. pkg.
1954							
January.....	\$41.38	\$26.40	\$38.80	\$42.75	\$59.70	\$70.00	\$75.50
February.....	39.50	21.95	39.20	42.55	55.60	65.61	74.90
March.....	38.44	25.86	39.00	45.92	57.40	66.00	72.70
April.....	39.60	26.35	38.90	48.15 ^a	59.70	69.00	73.80
May.....	41.05	27.22	39.00	46.58	64.11	67.58	75.05
June.....	41.10	26.30	34.88	46.16	62.31	65.10	72.68
July.....	41.62	23.10	33.50	43.78	60.90	64.50	65.62
August.....	41.22	23.12	33.40	39.08	56.00	66.00	64.50
September.....	40.58	23.38	34.00	39.40 ^a	55.47	60.30	62.00
October.....	40.72	22.60	34.00	39.75	50.38	55.62	59.50
November.....	39.25	22.25	34.00	39.00	51.30	56.75	58.25
December.....	39.63	22.88	35.32	39.60	46.40	57.20	58.50
Calendar Year							
1954.....	40.34	24.53	36.17	42.56	56.61	63.64	67.75
1953.....	40.62	26.76	37.37	43.72	55.98	63.42	66.66
1952.....	54.19	40.04	53.13	53.35	53.06	58.81	51.79
1951.....	56.30	45.94	55.74	57.69	52.35	58.20	54.85
1950.....	46.50	38.08	47.15 ^b	50.63	52.24	55.84	53.77
1949.....	41.81	31.82	40.92 ^b	48.61	55.09	57.46	57.45

^a April through September inclusive spring lamb.

^b Skin-on prices.

Wool

Wool trading was characterized by moderate activity the first half of the year and dullness much of the remainder. Part of the dull late year trading was occasioned by a wait-and-see attitude among growers as a new program of wool price support was to go into effect with the beginning of the new marketing year April 1, 1955.

California in 1954 ranked second in the Nation in the number of sheep shorn but was third in volume of wool produced.

Wool sales in January and February were confined largely to lambs wool in the Imperial Valley at 50-53 cents a pound grease basis, and some contracting of the coming clip of Sacramento Valley ewes wool at 62-63 cents for 12 months clip and 55 cents for eight months growth. In March and April there were moderate sales in the San Joaquin Valley of 12 months ewes wool at 50-63½ cents per pound grease basis, while many sales were made in the Sacramento Valley at 63 cents to 70 cents with some very light shrinking fine wools upward to 73 cents. In May and June a fairly large quantity of ewes wool sold near Fresno at 58-62 cents per pound and lambs wool at 50-52½ cents. Scattered small lots of Mendocino County light shrinking wool sold at 70 cents. Trade on wool was very quiet for much of the remainder of the year, though one large pool of lambs wool was sold in November to a West Coast manufacturer at \$1.04 clean basis, and Imperial Valley lambs wool was sold in December at 48-53 cents per pound grease basis.

HAY, GRAIN, AND FEEDS

Market prices for California hay, grain, and feed commodities again worked downward. Of the commodities reported by this bureau, only wheat and corn brought prices above 1953. Outstanding were the very low prices for hops. Abundant supplies were mostly pointed to as the principal factor affecting lower prices in California. The 1954 California production of field crop commodities set a new record high and exceeded the previous record in 1950 by about 7 percent. The nationwide supply of feed concentrates for the 1954-55 feeding season was estimated at 181,000,000 tons, 5 percent above the 1953-54 supplies.

Prices for feed commodities in most parts of the country strengthened slightly in the fall and winter months of 1954. A factor was the heavy movement of 1954 crops of feed grains under price support and the large stocks of old crop corn in CCC hands. Through December 15, a record of 61 million bushels of oats and 85 million bushels of barley and a near record of 77 million bushels of grain sorghums had been placed under loans and purchase agreements, from the 1954 crop. On the other hand, the quantity of 1954 crop corn placed under price support was much smaller than a year earlier. The national index of prices received by farmers on December 15, 1954, for feed grains and hay was 4 percent above the same date a year ago; food grains 1 percent above; oil bearing crops 4 percent above.

Reports indicate that California feeders were shifting more to barley as feed in place of a number of other important feedstuffs. Barley prices June through December, 1954, averaged 12 percent below the comparable period a year earlier, a greater price decline than most other feedstuffs. Prices of corn, wheat, and alfalfa hay averaged within 1 percent of those a year earlier. Milo was down 8 percent and standard millrun 3 percent. Molasses beet pulp prices showed an average decline of around 18 percent but other commercial feedstuffs mostly sold at higher prices than a year earlier or showed smaller reductions than in feed barley markets. Indicative of changes in feeding practices, inspected receipts of corn at principal California terminal markets June through December dropped to 3,127 cars against 4,799 cars a year earlier. Oats inspections amounted to 375 cars against 923 during the same months of 1953. Grain sorghum receipts of 1,049 cars represented an increase of around 275 cars, but were well below other recent seasons. Receipts of out-of-state barley totaled 74,404 tons against 61,204 tons in the months June-December, 1953. Receipts of grains this season were largely from Arizona and intermountain states but included around 9,063 tons from Mexico.

Grain shipments by truck into California from other states totaled 321,512 tons during the 12-month period ending February 28, 1955, an increase of 48,725 tons or 18 percent over the 272,787 tons received during the like period a year earlier. Receipts of corn, milo, wheat and miscellaneous grains increased, barley decreased, and oats were practically unchanged. Truck passings of grain into California as shown on the following page are compiled and issued monthly by the Market News Service in cooperation with the Bureau of Plant Quarantine. Similar rail data are not available.

Grains

Prices for California grains again worked downward, a continuation of the trend which started in 1952. Of the principal grains produced in California, only wheat and corn brought prices comparable to 1953. The government support program remained a very dominant market influence. Without exception, total supplies nation-

INBOUND PASSINGS OF GRAIN BY TRUCK THROUGH CALIFORNIA BORDER STATIONS
(Tons)

Commodity	Year ended February 28		1955 as percent of 1954
	1955	1954	
Corn.....	22,616	10,836	209
Milo.....	165,624	141,857	117
Wheat.....	83,600	58,002	144
Barley.....	28,913	42,165	69
Oats.....	18,886	18,896	100
Other grain.....	1,873	1,031	182
Totals.....	321,512	272,787	118

wide exceeded the demand. Large quantities of California's grain crops, as well as nation-wide, were pledged to the government support program. Market prices were moderately to slightly below the support level.

Barley: California barley markets weakened during 1954 with prices averaging the lowest in five years. Burdensome supplies, declines in other grains, and lower support prices provided the principal weakening influences. Supplies at the beginning of the 1954-55 crop year June 1, 1954, were well above any other season of record reflecting an above-average carryover of old crop barley and the largest crop in the State's history. Distribution during the first seven months of the season was about one-eighth larger than the comparable period a year earlier, due to increases both in exports and local usage. Stocks at the close of 1954, however, were 6 percent larger than any corresponding date for which data are available. Prices fell below government support levels and California growers placed nearly 560,000 tons of 1954 crop barley under loans and purchase agreements through December 15.

Supplies of California barley at the beginning of the 1954-55 crop year totaled 1,855,875 tons. This was almost 10 percent above the former record of 1,688,749 tons in 1950-51. Carryover stocks totaled 178,323 tons. The 1954 California barley crop, according to the December report of the Crop Reporting Board, was the largest of record and totaled 1,677,552 tons. The bumper 1954 crop was the result of sharply increased acreage and a favorable growing season.

The record 1954-55 supplies moved into distributing channels at an unusually rapid rate but stocks remaining January 1, 1955, were about 6 percent larger than any other comparable date of record and amounted to 925,559 tons. These January 1st stocks pointed to a June through December distribution of 930,316 tons. Larger distribution compared with a year earlier reflected increases in both local usage and out-of-state shipments. Local usage, including that for feed, malting and seed re-

GRAINS^a—MONTHLY AVERAGE WHOLESALE PRICES AT SAN FRANCISCO
(Dollars per 100, Bulk Basis)

Month	Barley		Wheat		Corn		Milo		Oats	
	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953
January.....	\$2.92	\$3.41	\$3.98	\$3.93	\$3.48	\$3.58	\$3.22	\$3.47	\$3.01	\$3.55
February.....	2.75	3.23	3.95	3.90	3.45	3.49	3.23	3.37	3.02	3.52
March.....	2.68	3.50	3.95	3.91	3.50	3.53	3.35	3.50	3.00	3.54
April.....	2.42	3.46	3.93	3.91	3.53	3.54	3.34	3.35	2.90	3.50
May.....	2.31	2.98	3.92	3.94	3.61	3.67	3.50	3.38	2.83	3.40
June.....	2.30	2.73	3.61	3.79	3.70	3.58	2.90	3.29	2.56	3.16
July.....	2.41	2.86	3.64	3.72	3.62	3.66	3.03	3.37	2.48	3.07
August.....	2.46	2.82	3.68	3.66	3.53	3.70	2.92	3.44	2.48	3.05
September.....	2.63	2.88	3.84	3.70	3.58	3.69	2.78	3.22	2.65	2.99
October.....	2.65	2.89	3.86	3.79	3.47	3.46	2.80	3.87	2.74	2.93
November.....	2.65	2.98	3.86	3.88	3.48	3.43	2.90	3.02	2.75	2.94
December.....	2.71	2.99	3.87	3.97	3.52	3.51	3.06	3.17	2.84	2.96
Average.....	2.57	3.06	3.84	3.84	3.54	3.57	3.09	3.37	2.77	3.22

^a Barley—Good feed barley comparable to No. 2 Bright Western testing 44 pounds per bushel. Wheat—No. 2 Soft White. Corn—No. 2 Yellow. Milo—No. 2 Yellow. Oats—Sample grade red feed oats suitable for grinding.

quirements during June through December, apparently totaled 698,019 tons. Shipments to points outside of the State, consisting of exports together with movement to Hawaii and Eastern markets, totaled 232,297 tons.

Exports of California barley during June through December totaled 212,839 tons compared with 154,807 tons during the comparable period a year earlier. Japan continued the principal destination for California barley exports with shipments to that country reported as 139,893 tons. Shipments to Continental Europe increased to 40,653 tons against only 2,609 tons a year earlier and reflected the somewhat smaller European crop. Around 7,252 tons of California barley were also shipped to the United Kingdom, the first movement to that area since 1939. Prior to World War II, the United Kingdom was the principal foreign customer for California barley, but movement ceased until this season when regulations were relaxed to permit the United Kingdom breweries to use 10 percent of their material from grain produced in foreign countries.

Local feeders and feed manufacturers remained the principal outlet and during June through December they took around 558,174 tons. Increased number of animals to be fed, some shift to barley from other high priced feedstuffs, together with more favorable livestock feed ratios were factors making for greater usage. Usage of barley by west coast maltsters during June through December was reported at 41,399 tons. Shipments of California barley to other states dropped to the lowest point in 11 years and amounted to 12,843 tons.

Reflecting large supplies, declines in other grains and lower support levels, California barley prices in 1954 averaged the lowest in five years. At San Francisco, good feed barley testing 44 pounds per bushel and generally comparable to No. 2 Bright Western sold at \$2.95-2.97½ per 100, at the first of January, 1954. Prices declined quite steadily in late winter and early spring months and reached a low point of \$2.17½-2.22½ during the third week in May when it was becoming increasingly apparent that the 1954 crop would be the largest of record. Markets strengthened somewhat reflecting increased distribution together with the large quantities placed under the 1954 support program. The high point for the first seven months of the 1954-55 season was reached in early December, when this grade sold at \$2.75 per 100. At the close of December, the market was \$2.70 per 100. No. 2 Western barley testing 45 pounds per bushel averaged \$2.56½ per 100 and choice feed Mariout testing 46 pounds per bushel and generally comparable to No. 1 Bright Western sold at an average price of \$2.59¼ per 100 during June through December. Medium malting types sold in a range of \$2.40-2.85 per 100 and averaged \$2.69 compared with \$3.05½ during the first seven months the previous season. Good and choice malting types brought \$2.50-2.95 per 100 with prices averaging \$2.78½ against \$3.20½ per 100 during the same months a year earlier.

Market trends at the Los Angeles barley market were largely similar to those at San Francisco but at a somewhat higher level. No. 2 Western barley testing 46 pounds per bushel sold from a low of \$2.45 per 100 in June to a high of \$2.80 in December and averaged \$2.67½ per 100, bulk basis. This compares with \$3.01½ during the comparable seven months a year earlier and \$3.57½ per 100 two years back. At the close of December, this grade was selling at Los Angeles at \$2.75-2.80 per 100, compared with \$3.06¼-3.08¼ per 100 a year earlier.

California barley prices averaged well below the 1954 crop support rates of \$1.40 per bushel (\$2.91½ per 100) for No. 2 or better Western barley at San Francisco, Los Angeles, Oakland, and Stockton terminals, and the supports of \$1.23-1.27 per bushel (\$2.56¼-2.64½ per 100) for the same grade in the principal producing counties. As a result, participation in the program has been much greater than in 1953. California growers placed 558,823 tons of 1954 crop barley under support through December 15, or 33.3 percent of the entire crop. This compares with 141,910 tons of 1953 crop barley, or 11.2 percent of the crop through the same period last year.

Wheat: Prices for California wheat fluctuated within a comparatively narrow range as the government support program was a principal steadying influence. The level and trend of prices throughout the year were very similar to 1953. The high point was in January and February. Prices dropped to the lowest point during the harvest period in June, then advanced gradually the remainder of the year. The calendar year average of Thursday wholesale prices at San Francisco was \$3.84 per 100 bulk for No. 1 Soft White California wheat, the same as the 1953 average. Prices at Los Angeles ranged about 10 cents per 100 above San Francisco and averaged \$3.95 compared with \$3.92 in 1953. A feature of the Southern California wheat trading were sales during the late summer in San Luis Obispo County of substantial tonnages of Ramona variety wheat purchased by Midwest cereal and semolina manufacturers.

The 1954 California wheat crop was the smallest since 1946 and totaled 277,800 tons. The total national output of wheat in 1954 was 970 million bushels (29,100,000 tons) and was 200 million bushels (6,000,000 tons) below 1953.

Stocks of wheat in all positions nation-wide on January 1, 1955, were the largest on record and totaled 1,460 million bushels. Of the total January 1 stocks, a little over seven million bushels of 1953 or older wheat were owned by the Commodity Credit Corporation not including 351 million bushels of the 1954 wheat crop put under price support through December 15, 1954.

Disappearance of wheat nationally, January through December, 1954, was the smallest since 1941 with the exception of 1953 and totaled 412 million bushels. Milling of wheat for flour increased due in part to larger flour exports. Exports of wheat and flour, July through December, 1954, were estimated at 121 million bushels compared with 108.5 the same months of 1953 and 154.6 million the same months of 1952. Sales of wheat by the CCC, July 1, 1954, through January 14, 1955, amounted to over 133 million bushels. This was nearly three times the 46 million bushels sold during the same months of 1953.

Corn: Featuring the 1954 California corn season was the greatly expanded acreage and production. California acreage was more than double that of 1953 and the total production almost triple. Stimulating increased production were the limitations of cotton acreage, the deficit production of corn in California, and a market umbrella furnished by the high Midwestern corn support price. Most of the increased production was in the southern San Joaquin Valley though noticeably increased amounts were also produced in the northern San Joaquin Valley and in the Sacramento Valley. The California crop sold well at markets and averaged similar or only slightly below comparable grades for Midwestern productions.

Wholesale prices for corn at California terminal markets fluctuated more widely than in 1953 though averaged very similar. Prices generally followed those established in Midwestern markets though California prices broke noticeably in August under the pressure of rather heavy offerings of locally grown corn. However, the market quickly stabilized and more than regained the loss by reaching the season high in September. The calendar year average price for No. 2 Yellow corn was \$3.54 per 100 bulk at San Francisco and \$3.53 at Los Angeles compared with \$3.57 and \$3.56 respectively in 1953.

Milo: Grain sorghum prices at California terminal markets advanced seasonally the first five months of the year but declined sharply in June to the lowest point since 1950. The outlook for a large 1954 crop was a weakening influence. Prices held fairly steady the last half of the year at comparatively low levels. The calendar year average price for No. 2 Yellow milo was \$3.09 per 100 at San Francisco and \$3.12 at Los Angeles compared with \$3.37 and \$3.31 in 1953.

Drought conditions in Midwestern areas which had severely curtailed production a year ago was considerably relieved and market supplies the last half of the year were noticeably heavier. Generous supplies of Arizona milo were received at California points, particularly in Southern California. The heavy movement of milo into Southern California by truck rather than by rail continued to appear to be one of the most significant developments in the marketing of grain in the Southern California area.

Oats: Oats prices ranged downward in 1954. The record California production and the near record nation-wide production provided fully ample supplies. Total U. S. stocks of oats in all positions on January 1, 1955, totaled 1,016,000,000 bushels, the second largest on record. Disappearance of oats the first six months of the 1954-55 crop year totaled 725.6 million bushels, 42.5 million more than the same period a year ago. Domestic supplies for the 1954-55 season were 251.6 million bushels more than last season. Exports of oats June through December were the largest since 1949 while imports in this period were the smallest since 1947. Large quantities were placed under the government price supports.

Wholesale prices in California ranged widely depending upon quality and type. At San Francisco, California grown sample grade Red oats suitable for grinding purposes opened 1954 at \$2.90-3.00 per hundred bulk, dropped steadily to the season's low in August of \$2.45-2.55, then advanced and closed December at \$2.85-2.90. The calendar year average was 46 cents per 100 below 1953. At Los Angeles, wholesale market prices for No. 2 White oats produced in other states, ranged similar to slightly above 1953 with the 1954 calendar year averaging \$3.53 per 100, 4 cents above 1953.

A feature of the trading was the absence of Argentine oats which had comprised a very important position in California oats markets in 1953. A federal embargo restricting the imports of foreign oats was responsible for the negligible offerings of Argentine oats.

Rice: Influenced largely by declines in southern and other world markets, prices of California milled rice during the 1953-54 season averaged around \$1.84 per 100 lower than in 1952-53. No. 1 California Pearl sold in a range of \$8.50-9.50 per 100, San Francisco docks basis, and averaged \$9.15. This compares with \$10.99 a year earlier and \$8.29 per 100 the previous 10-year average. High for the crop year occurred in March, while the low was reached in September when mills reduced prices to move remaining old crop supplies before the new crop started to move. At the close of 1954, the market for this quality was still quoted at \$8.50 per 100. No. 1 Calrose sold in a range of \$8.75-10.00 per 100, San Francisco docks basis, and averaged \$9.53 compared with \$11.41 per 100 the previous year. Similar to California Pearl, the high point for No. 1 Calrose during the 1953-54 season was reached in March while the low point occurred in September with that price remaining in effect until the close of 1954. Second heads sold in a range of \$6.75-8.50 per 100 f.o.b. mills and averaged \$7.88 compared with \$8.65 a year earlier and \$6.05 the 10-year average. Prices of screenings averaged \$7.25 per 100 f.o.b. mills during the 1953-54 season compared with \$7.59 a year earlier and \$5.70 the 10-year average. Brewers' rice prices ranged from \$5.30-7.80 per 100 and averaged \$7.17 compared with \$7.59 in 1952-53 and \$5.55 per 100 the 10-year average.

California rough rice prices declined along with milled rice during the 1953-54 season but continued well above the average of other recent years. Prices paid growers for the 1953 crop, according to the Crop Reporting Service, averaged \$5.38 per 100 compared with the record high of \$6.25 for the 1952 crop and \$4.27 per 100 the previous 10-year average. At the close of 1954, growers were reported as receiving \$4.25-4.30 per 100 for No. 1 California Pearl rough rice yielding 48 pounds milled head and 70 pounds total milled rice, bulk, country warehouse receipt basis. This compared with \$5.00 per 100 a year earlier.

ROUGH RICE ^a—MONTHLY AVERAGE PRICES TO GROWERS

1954 AND 1953

(Dollars per 100, Bulk Basis)

Month	1954	1953	Month	1954	1953
January.....	\$5.04	\$6.04	July.....		Nominal
February.....	4.93 ^a	6.26	August.....	\$4.79	Nominal
March.....	4.99 ^a	6.39	September.....	Nominal	Nominal
April.....	5.00 ^a	6.75	October.....	4.28	\$4.69
May.....	5.00	6.72	November.....	4.28	4.75
June.....	4.86	5.98	December.....	4.28	4.91

^a No. 1 California Pearl, mostly basis 48 pounds milled head and 70 pounds total milled rice, except during February, March, and April when trading was on a flat basis depending upon quality.

Distribution of California rice during the crop year ending August 30, 1954, surpassed any other season with record supplies meeting active demand. Disappearance of rough rice amounted to 12.3 million cwt., while shipments of milled rice, including brokens, totaled 8.4 million cwt., or more than 50 percent larger than the previous 10-year average. Takings of California milled head rice by distributors in the island territories and domestic markets were somewhat smaller than a year earlier but this was more than offset by increased exports to Japan where the 1953 crop was the smallest in eight years.

Exports represented by far the most important item of distribution of California milled head rice in 1953-54 and amounted to 4,535,800 cwt. compared with 3,223,681 in 1952-53 and 1,287,803 cwt. the previous 10-year average. Exports were principally to Japan with takings by that country reported as 4,478,879 cwt. This compares with 1,771,367 cwt. in 1952-53 and 3,283,774 cwt. in 1951-52. Prior to 1951-52, exports of California rice to Japan were negligible since most of that country's import needs was secured from other Asiatic countries. The 1953 rice crop in Japan was about 17 percent smaller than the year before and continued scarce supplies in other important rice-producing areas stimulated further interest in California offerings. Purchases were chiefly of No. 5 California Pearl, undermilled rice, with

35 percent broken. Exports of California rice to countries other than Japan during the 1953-54 season apparently amounted to only 56,921 cwt., most of which went to Cuba, Canada, Peru, Bolivia, Lebanon and South Pacific Islands.

Feedstuffs and Concentrates

Feedstuff and concentrate prices averaged below 1953 as well as 1952 and 1951. Soybean meal, meat scrap meal, and cottonseed meal averaged above 1953. Copra meal averaged sharply lower; standard millrun and beet pulp moderately lower; linseed meal and fish meal slightly lower. Alfalfa meal averaged similar to 1953 but below 1952. Part of the sharp price break in cottonseed meal late in 1953 was regained early in 1954 after which prices held relatively steady. Demand for feed concentrates in California remained rather broad compared with the period a few years back because of increased meat animal, dairy cattle, and poultry feeding. However, supplies of most items were fully ample for the demand.

FEEDSTUFFS AND CONCENTRATES—MONTHLY AVERAGE WHOLESALE PRICES AT LOS ANGELES—1954 AND 1953

(Dollars per Ton, Sacked, Delivered Los Angeles Area)

Month	Standard millrun		Cottonseed meal		Copra meal		Linseed meal		Soybean meal	
	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953
January.....	\$58.56	\$64.13	\$71.00	\$85.31	\$73.44	\$84.75	\$78.87	\$88.31	\$100.57	\$97.82
February.....	56.81	62.50	71.00	84.50	75.13	85.75	79.50	87.81	104.07	95.75
March.....	54.50	62.15	69.90	77.45	71.20	86.65	80.00	85.60	111.72	95.77
April.....	55.00	59.50	70.25	69.50	66.00	86.69	80.00	78.00	122.63	93.24
May.....	53.75	65.81	71.25	63.25	65.56	83.38	80.00	76.50	118.44	96.88
June.....	55.80	63.55	69.90	63.25	62.45	78.40	70.60	75.30	116.52	95.67
July.....	56.69	59.13	67.25	63.25	61.62	75.00	64.87	73.50	122.01	95.20
August.....	54.25	53.81	68.60	63.44	66.20	69.13	69.70	73.25	115.72	91.43
September.....	51.38	51.50	69.38	63.70	64.81	66.90	69.13	71.80	96.44	88.11
October.....	50.88	47.06	70.00	61.06	60.87	67.62	69.00	71.50	94.94	86.51
November.....	49.95	51.13	68.90	57.62	62.20	68.38	70.80	71.50	95.82	88.71
December.....	51.38	56.30	70.50	66.60	72.62	68.90	71.50	76.80	94.51	99.52
Average.....	\$54.08	\$58.05	\$69.83	\$68.24	\$66.84	\$76.80	\$73.66	\$77.49	\$107.78	\$93.72

Standard Millrun: As the result of a generally attractive competitive price and usually ample supplies, standard millrun maintained its position as one of the leading ingredients used in formulated mixed feeds. Generous supplies produced by California's flour industry were supplemented heavily most of the year by supplies from Intermountain and Pacific Northwestern areas. Prices reached their highest level early in the year, then gradually drifted downwards. The 1954 average wholesale price was \$53.44 per ton at San Francisco and \$54.04 at Los Angeles, about \$5.00 per ton below 1953. Indicative of the attractive price of millrun was the short period during the spring when very light offerings of White wheat bran were held for premiums of \$20.00 per ton over millrun. The usual differential ranged \$5.00-10.00 per ton most of the year.

Cottonseed Meal: The record number of beef cattle finished for market, combined with the normal heavy dairy cattle feeding, provided a ready outlet for liberal supplies of cottonseed meal. As the result of this good demand, marketings of cottonseed meal were easily placed throughout the year at prices which showed only minor fluctuations. As usual, the bulk of trading was in expeller-processed meal which was supplemented at most times by solvent-process material from California and Arizona. Due to the prevailing feeder preference for expeller meal, marketings of solvent meal generally moved at moderate discounts below expeller. The steadiness in cottonseed meal prices was in contrast to the situation in 1953 when adjustments in the cotton price support program as well as the extensive emergency drought feed program in the central and southern states resulted in severe fluctuations in local cottonseed meal prices. The 1954 average wholesale prices of \$69.79 at Los Angeles and \$74.04 at San Francisco were similar to those of 1953. These averages, however, were well below peak prices in early 1953 of around \$90.00 per ton and moderately above the lowest point of the past seven years of around \$60.00 per ton in November, 1953.

Copra Cake and Meal: Substantial tonnages of imported and domestic copra cake and meal continued to be absorbed by California dairymen, with especially heavy consumption in Southern California. Because of its high palatability and good nutritional value, most dairymen continued to consider copra cake among the most desirable ingredients for inclusion in feeding rations. Copra cake prices fluctuated rather widely throughout the year, in large part reflecting variations in supplies rather than in the overall demand. An important factor in the varying supplies was the substantial dependence on imported supplies, particularly from the Philippine Islands which in turn reflected the availability of shipping facilities and demand from European countries. The 1954 average wholesale price was about \$10.00 per ton below 1953 and the lowest since 1949.

Linseed Meal: The outlet for linseed meal remained comparatively limited. While many livestock feeders and mixed feed manufacturers continued to include small amounts of linseed meal in their rations because of its good conditioning effect, the overall demand for linseed meal was limited because of the relatively high price of its protein content compared with other ingredients. Prices were exceptionally stable most of the year with marketings fully ample for the demand. Prices dropped sharply early in the summer in an adjustment to a new crop basis but otherwise showed only small fluctuations.

Soybean Meal: California's poultry industry continued to depend on soybean meal as the chief source of vegetable high protein feed. Trading in soybean meal throughout the year was featured by prices which fluctuated over a rather wide range influenced by similar variations in soybean prices. The usual good domestic outlet for soybeans was supplemented periodically by heavy export sales; which, when combined with the normal speculative trading, made for very volatile soybean prices. During the period of advancing prices the first nine months of the year, soybean meal met sharp price competition from imported sesame and sunflower seed meals as well as from meat scraps. In many instances the availability of these other ingredients at comparatively attractive prices encouraged increased utilization of such items and lessened the demand for soybean meal. When the market adjusted to a new crop basis in the early fall and prices declined rapidly, soybean meal again enjoyed competitively attractive prices.

**FEEDSTUFFS AND CONCENTRATES—MONTHLY AVERAGE WHOLESALE PRICES
AT LOS ANGELES—1954 AND 1953—Continued**

(Dollars per Ton, Sacked, Delivered Los Angeles Area)

Month	Molasses beet pulp		Fish meal		Meat scrap meal		Suncured alfalfa meal		Dehydrated alfalfa meal	
	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953
January.....	\$54.52	\$73.50	\$143.25	\$141.00	\$101.25	\$95.69	\$42.50	\$50.75	N	\$62.88
February.....	54.52	73.50	139.87	138.60	100.31	91.50	43.87	46.44	\$59.25	57.88
March.....	54.52	73.50	142.20	140.24	111.00	90.75	40.10	41.20	52.40	52.10
April.....	43.50	73.50	143.25	142.50	120.00	87.87	37.75	40.50	51.62	50.13
May.....	43.50	62.00	144.75	143.62	124.38	85.31	36.50	39.38	46.75	47.38
June.....	43.50	62.00	142.90	147.90	125.75	90.30	35.25	37.50	44.70	45.20
July.....	43.50	61.25	144.38	148.88	126.87	98.31	34.50	37.00	44.62	47.00
August.....	43.50	57.31	138.00	137.13	114.25	103.13	36.50	37.00	46.20	47.62
September.....	43.50	55.05	130.87	132.00	100.00	92.50	40.69	37.00	48.00	46.00
October.....	43.50	49.25	131.62	133.87	100.00	78.87	44.13	37.00	51.00	44.00
November.....	47.10	49.25	130.65	158.35	94.00	81.19	44.90	37.38	52.00	45.25
December.....	49.50	49.51	135.00	174.25	90.25	95.00	43.75	38.50	51.12	48.50
Average.....	\$47.06	\$61.64	\$138.90	\$144.86	\$109.00	\$90.87	\$40.04	\$39.97	\$50.64	\$49.50

N—Nominal.

Molasses Beet Pulp: Liberal supplies of molasses beet pulp were in generally good demand, especially during the fall and winter months when record numbers of beef cattle were being finished for market. Prices declined sharply during the spring, reflecting an adjustment to new crop basis, but held very steady during the summer and fall. Prices advanced in November and December when demand became more active because of a rapid increase in numbers of feeder cattle arriving in feed lots.

The year's average price was well below 1953 and 1952 which encouraged consumption not only by beef cattle feeders but by dairymen also.

Fish Meal: Marketings of fish meal continued to meet a rather ready outlet for use in poultry feeds. Although offerings of California sardine meal remain very light due to the restricted catch, supplies of locally produced tuna meal and imported herring meal were generally adequate to meet feeders' requirements. Important foreign sources of herring meal were Peru, Norway, Denmark, and Canada. Fish meal prices averaged slightly below other recent years but remained somewhat above competitive ingredients on a protein basis. The insistence of many poultrymen that fish meal be included in their feeding rations, combined with the high nutritional value of this item, were important factors tending to encourage the use of fish meal when competitive materials were available at somewhat lower prices.

Meat Scrap Meal: Meat scrap meal was a major animal high-protein concentrate utilized by poultry feeders. Although meat scrap prices moved through a wide range during the year, the prices were generally competitively attractive especially on a protein basis. Comparatively high prices on soybean meal and on light offerings of fish meal encouraged a heavy usage of meat scrap meal. Marketings from local meat packers and renderers were usually fully adequate to meet local needs but these supplies were occasionally supplemented by offerings from Intermountain and Southwestern States when the price differential was at least sufficient to cover transportation costs. Prices averaged above 1953, reflecting increases in demand resulting from the comparatively high soybean meal prices and increased poultry feeding.

Alfalfa Meal: Poultrymen and rabbit raisers continued to absorb the very liberal supplies of high quality suncured alfalfa meal produced by local mills. In comparison to alternative items, prices of suncured meal were generally attractive and this stimulated utilization. Price levels averaged about the same as in 1953 although the fluctuations were not as marked. After steadily declining from the first of the year, prices reached their lowest point in July, then advanced. In general, suncured alfalfa meal prices were influenced by baled alfalfa prices and followed a similar seasonal pattern. As a result of sharply competitive conditions, meal prices in July declined to the lowest level since 1950 but then strengthened under the influence of advancing alfalfa hay prices. Dehydrated alfalfa meal price trends and market conditions were similar to those for suncured meal though the premium for this type of meal was greater than in 1953.

Hops

Hop markets weakened materially during 1954 reflecting slackened demand both for domestic usage and export. Prices declined to the lowest level since 1937. Distribution during the crop year ending September 30, 1954, was the smallest in 10 years. Usage by domestic breweries was the lowest since the 1942-43 season with a further decline in the average usage of hops per barrel of fermented malt liquors. Increased production in important European producing areas made for lighter foreign demand for United States hops and exports were the smallest for any season since 1947-48. In contrast, United States imports of hops increased to the highest point since the 1939-40 crop season.

Distribution of United States hops during the 1953-54 crop year apparently was the smallest since the 1943-44 season. Supplies at the beginning of the season totaled 56,653,000 pounds, including a carryover of 24,850,000 pounds and the 1953 crop of 41,803,000 pounds. These were supplemented by imports of 6,230,000 pounds, providing total supplies of 72,883,000 pounds for the season. At the close of the crop year, these stocks had been reduced to 26,030,000 pounds, pointing to a distribution of 46,853,000 pounds. This compares with 50,849,000 pounds in 1952-53 and the previous 10-year average of 49,797,900 pounds.

Usage of hops by domestic breweries during 1953-54 season was well below other recent years and totaled 34,203,822 pounds. The average usage of hops per barrel of fermented malt liquors declined to a new record low of .376 pounds against .385 in 1952-53 and .435 pounds the 10-year average. United States exports of hops during the 1953-54 season were the smallest in six years and totaled 11,381,133 pounds. The smaller exports compared with other recent seasons reflected to a considerable extent larger supplies in important European producing areas which provided increased competition for American hops. In contrast with the decline in exports, United States imports increased sharply in 1953-54 and totaled 6,229,892 pounds compared with 3,538,999 in 1952-53 and 3,094,308 pounds the 10-year average.

Reflecting slackened demand, hop prices declined sharply to the lowest point in 17 years. Prices paid growers at the beginning of the 1953-54 crop year were mostly

on the basis of 37-39 cents per pound for regular seeded clusters and 40-42 cents per pound for seedless hops, basis 6 percent leaf and stem content. Prices showed little change during late fall and early winter months, but showed moderate declines toward the close of the crop year. On September 30, 1954, the market for regular seeded clusters was quoted at 34-35 cents per pound and seedless 37-39 cents per pound. Drastic declines toward the close of 1954 reflected an increase in United States supplies for the new crop year and continued slow demand for both domestic usage and export. On December 30, 1954, the market for regular seeded clusters and seedless hops was placed at 15 cents per pound, net to growers.

Beans

Dry bean markets were irregular. Price trends were upwards for Large Limas, Small Whites, and Red Kidneys during the old crop period January through August, 1954, resulting from light tradeable supplies. Trends for other varieties in this period generally were downward, due to slow domestic and export demand and moderate selling pressure from growers.

Upward price trends in the new crop period September through December, 1954, were recorded for Blackeyes, Small Whites, Cranberrys, and Red Kidneys because of good demand and light supplies. Downward trends in this period were made in Large Limas, Pinks, California Reds, and to some extent in Baby Limas and Pintos due to large production, some selling pressure and slow demand in domestic and export markets as well as an adjustment to lower support prices.

DRY BEANS—MONTHLY AVERAGE OF DEALER SELLING PRICES—1954 AND 1953

(Dollars per 100 Sacked, U. S. No. 1 Quality, F.O.B. Country Loading Point)

Month	Large Limas		Baby Limas		Small Whites		Blackeyes		Pinks	
	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953
January.....	\$11.48	\$11.30	\$7.05	\$7.04	\$9.52	\$8.52	\$8.56	\$12.48	\$8.94	\$8.98
February.....	11.52	11.35	6.56	7.34	9.98	8.46	7.63	12.98	8.73	10.01
March.....	11.66	11.46	6.67	7.66	10.42	8.72	8.34	13.12	8.64	11.46
April.....	11.76	11.45	6.64	7.92	10.88	8.84	7.99	12.77	8.55	11.84
May.....	11.79	11.56	6.61	7.77	11.30	8.89	7.26	12.10	8.54	11.93
June.....	11.80	11.58	6.56	7.68	11.41	9.46	7.04	11.72	8.41	12.09
July.....	11.80	11.58	6.44	7.84	10.86	9.85	7.18	12.95	8.08	13.00
August.....	11.87	12.05	6.27	8.79	10.45	10.18	8.20	13.24	8.09	12.58
September.....	11.36	11.62	6.08	8.99	9.82	9.93	9.16	12.03	7.96	10.84
October.....	10.67	11.55	5.98	8.98	10.42	9.02	10.36	10.18	7.75	9.68
November.....	10.59	11.54	6.17	8.73	10.65	9.26	10.52	10.01	7.66	9.82
December.....	10.53	11.49	6.16	8.06	11.14	9.48	10.35	9.12	7.52	9.16

Baby Lima and Blackeye prices continued to drop rather sharply through February resulting from moderate selling pressure while demand was slow and dealers were buying mostly for nearby needs. The market strengthened around tax assessment time in March, then continued downward. Baby Limas reached a \$5.98 low in October, the lowest since July, 1942. Blackeyes dropped to \$7.04 in June, the lowest since August, 1949, then strengthened to close 1954 at \$10.35 per 100. Much of the 1953 production of Large Limas went under government support, leaving a light tradeable supply in the old crop period. This kept the market firm and prices advanced 40 cents between January and August. The larger 1954 crop caused prices to decline \$1.34 from the August high of \$11.87. Small Whites similarly were in light supply early in the year causing prices to rise to \$11.41 in June, the highest since December, 1950. As new crop supplies became available prices dropped but they soon advanced when rains in the northeastern states created a good demand. Large crops of Pinks and slow export demand caused prices to continue downward throughout the year. The decline started in July, 1953. Year end prices averaged \$7.52, the lowest since October, 1950. California Reds fluctuated within a 40-cent range in the old crop period but dropped \$1.94 from the August level of \$9.90 to \$7.96 in December, due to heavier production here and in other states. Release of some CCC stocks in October further burdened the market. Ample supplies and light demand caused Cranberry prices to drop \$2.75 between January and August to \$7.50, the lowest since September, 1950. Smaller new crop supplies caused prices to strengthen by \$1.60 in the September-December period. Red Kidneys generally advanced from \$9.45 in January to \$11.74 in December. Commercial supplies were moderate and offerings were readily absorbed under good demand. Prices for new crop Red Kidneys sold in

September-December averaged 98 cents higher than the prices received for the old crop in January-August. Pinto prices declined throughout the year. Though production was not unusual, Pintos closed the year at \$7, \$1.35 below January, 1954, and the lowest since September, 1951.

Hay

Alfalfa hay prices generally followed normal seasonal patterns in 1954. Prices in the Los Angeles area averaged slightly above 1953, whereas in Central California they declined to the lowest levels since 1950. Grain hay prices in the Los Angeles area averaged moderately below 1953.

The level and trend of prices during the past two years are illustrated in the table below.

HAY—MONTHLY AVERAGE PRICES OF ALFALFA AND GRAIN HAY—1954 AND 1953
(Dollars per Ton, Baled, Trucklots, Delivered Dairy)

Month	Alfalfa hay—U. S. No. 2 Leafy				Oat hay—No. 1 Los Angeles area	
	Los Angeles area		Petaluma area		1954	1953
	1954	1953	1954	1953		
January.....	\$32.19	\$33.69	\$29.69	\$40.56	\$37.00	\$44.62
February.....	32.19	31.81	29.50	37.00	37.00	41.75
March.....	29.40	30.35	28.25	37.20	36.00	38.60
April.....	29.44	31.19	26.41	34.31	33.00	38.15
May.....	28.00	28.94	25.70	32.25	32.30	36.87
June.....	26.19	28.60	22.94	29.60	29.63	34.00
July.....	24.56	26.25	22.75	27.25	28.75	31.38
August.....	26.25	24.70	23.75	26.00	30.10	30.50
September.....	28.37	25.06	26.75	24.81	31.00	30.87
October.....	31.81	25.56	29.44	23.75	33.25	32.00
November.....	32.30	27.40	31.45	25.40	34.40	33.00
December.....	30.50	28.81	32.00	28.13	35.00	35.38

Alfalfa Hay: Volume of alfalfa hay marketed in the *Los Angeles* area during 1954 reached a new record high for the third consecutive year. Increased volume was due to heavier consumption locally and to increased acreage and production in areas tributary to Los Angeles markets. Prices in 1954 averaged slightly higher than in 1953. They followed their normal seasonal pattern during most of the year. The winter highs were reached in late January and early February, and the harvest-season lows in July. A contra-seasonal decline occurred in late fall as offerings temporarily exceeded demand.

Principal factors contributing to the heavier Southern California hay consumption in 1954 included moderately increased cattle numbers and attractive hay prices compared with prices of other feedstuffs.

The beginning of 1954 found prices strengthening as natural feed was curtailed by drought conditions and frost. Rains late in January and muddy feedlots reduced demand. Prices declined, then steadied in March. Extremely heavy marketings early in May exceeded demand and the market weakened. Prices trended downward until mid-July to reach the lowest levels of the year.

At this time beef cattle feeders began to accumulate supplies. This accumulation, coupled with moderate speculative buying and reports of renewed drought conditions in South Central and Southern States, encouraged growers to hold more firmly and to ask higher prices. The firm holding soon was reflected in Los Angeles markets, and dealers depleted their supplies. With increased replacement costs, prices at Los Angeles advanced despite slow demand.

In September, demand from dairymen became active for late-cutting hay and prices advanced rapidly. Fall-produced hay was nearly exhausted by late October. Offerings exceeded light demand from feeders late in November and prices began to recede. Offerings were reduced, however, and the market steadied in December.

Central California alfalfa hay marketing in 1954 was featured by large carryover of 1953 crop, sharply increased deterioration in dairymen's financial condition, and lowest alfalfa prices since 1950.

The market was seasonally strong as the year opened, with prices advancing from the October, 1953, lows in a normal fall and winter uptrend that reached its peak

in January and February, 1954. Prices then began their usual seasonal downtrend, but dropped to the bottom faster and stayed there longer than normally. The recovery started in August-September and was still in progress in March, 1955.

Prices of No. 2 Leafy during the seven months main marketing season May through November averaged about \$20 per ton at grower ranch and about \$26 delivered in San Francisco Bay dairy sections. The table that follows shows average prices of No. 2 Leafy during the May-November heavy marketing period, for each of the last four years.

ALFALFA HAY—SEVEN MONTHS AVERAGE OF PRICES—1951-1954 SEASONS

(Dollars per Ton, Baled, U. S. No. 2 Leafy)

	Seven months, May-November			
	1954	1953	1952	1951
Dealer buying prices at grower ranch				
Southern Sacramento Valley.....	\$19.05	\$19.62	\$31.08	\$27.58
Stockton Delta.....	19.69	20.23	32.00	29.27
Tracy-Patterson district.....	20.65	21.18	32.73	30.02
Los Banos-Firebaugh district.....	20.47	20.65	32.57	30.39
Dealer selling prices, delivered to customer				
Petaluma dairy district.....	25.87	27.01	37.70	34.34
San Jose dairy district.....	26.27	27.27	38.38	35.43

Dairy incomes were adversely affected by a milk price reduction that became effective in January, and by over production of Grade A milk resulting in substantial portions being sold as manufacturing milk at lower prices. Dairy financial stress and alfalfa growers' large carryover of 1953 crop contributed importantly to the low level of hay prices during the 1954 harvest season.

Prices of Central California alfalfa were sufficiently low to permit shipment to Los Angeles area hay users. Sales to that market were made in each month of the year, with especially heavy movement of first and second cuttings in April, May, and June.

Although no official state figures are available on Central California alfalfa acreage and tonnage, the trade generally believes that 1954 acreage was slightly down from 1953, and that tonnage of hay produced was moderately down due to a sharp increase in acreage diverted to alfalfa seed production, some increase in acreage cut for alfalfa meal production, and lower than normal yield of fifth cutting per acre caused by unusually cool temperatures.

By the end of 1954, practically all of the 1953 crop carryover and most of the 1954 crop had been sold. Growers' supplies on hand were much smaller than at the beginning of the year. By February, 1955, supplies were scarce and hay was being shipped into Central California from Nevada.

Grain Hay: Grain hay trading in *Southern California* continued to diminish in volume during 1954, following the trend begun several years ago. Several factors remained largely responsible for the reduced activity. Many grain hay producers have diversified their farming operations in recent years so that a considerable portion of the grain hay produced is now fed by the grower to his own livestock. Comparatively high price support levels have encouraged harvesting barley and oats for grain rather than for hay. In areas where dairying is important many growers have found it more profitable to harvest and market the immature grain crops as green chopped feed rather than as hay.

On the demand side, many feeders, especially of beef cattle and horses, who formerly utilized a heavy portion of the grain hay output, have found certain types of alfalfa hay to be fully satisfactory for their needs. Many such feeders who shifted to alfalfa hay during the Korean emergency when grain hay was scarce and high priced have subsequently used less grain hay than formerly.

Prices of oat hay generally were influenced by those of alfalfa hay and followed a similar pattern although fluctuations were not as marked. As usual, light offerings of particularly fancy quality oat hay suitable for the retail trade, race tracks, or discriminating saddle horse stables moved at moderate to heavy premiums over good quality hay comparable to U. S. No. 1. Trading in barley hay during 1954 continued too light to establish market quotations.

FRUITS AND VEGETABLES

Market conditions for California fruits and vegetables again were irregular. As usual, prices for individual commodities varied with supply and demand conditions. Fresh market deciduous fruits and grapes averaged similar to 1953 though apricots, cherries, winter pears, and plums brought higher prices. Citrus fruits averaged above 1953 mainly reflecting higher prices for oranges. Vegetables averaged slightly below 1953 though the degree of price change was minor in most instances. Melons were lower as lower prices for cantaloups, watermelons, and Persian melons more than offset the higher prices for honeydew melons. Dried fruit prices again were high and averaged above 1953. Only dried apples and prunes brought lower average prices. Grapes for crushing sold at prices above 1953. Wine prices advanced slightly early in the year and were unusually steady the latter part. Honey prices averaged about the same as in 1953.

Supplies of California fruits and vegetables sold in fresh markets, as measured by rail shipments, interstate truck passings, and Los Angeles, San Francisco, and Oakland truck receipts, were 4 percent under 1953. Most of this decline was in rail shipments as truck movement both to local and interstate markets continued to increase. California rail shipments, though 9 percent below the comparatively heavy 1953 shipments, were only 2 percent below the previous 20-year (1933-1952) average. Total United States rail shipments of fresh fruits and vegetables were the lightest of records back to 1920. The percent of United States rail shipments of fruits and vegetables originating in California the past 30 years has increased almost steadily, peaking at 41 percent in 1953 and dropping but slightly to 39 percent in 1954.

The shift in container types and prepackaging gained additional momentum and probably were the outstanding features of the year. Emphasis was on smaller, more colorful containers and on better arrival quality. Nearly every commodity was shipped in fiberboard containers of one type or another. The use of fiberboard containers for many commodities was still in the experimental stage, but for some, except for delivery to local markets, the shift was almost complete. The transition from wood to carton containers and the extreme variation in types of containers used for a single commodity often resulted in considerable confusion amongst the industry. The great increase in numbers of self-service markets in which customers select their own produce has put added emphasis on quality.

Packaging of lemons for shipment to eastern markets had largely shifted to the half-box carton in 1953 and the use of this container for local market sales became increasingly popular in 1954. Oranges and grapefruit swung rapidly to the half-box carton with trade estimates late in 1954 indicating that better than 75 percent of the movement of these two commodities, other than to local markets, was in cartons. The bulk of the lettuce shipments to eastern markets was packed in half-box cartons though substantial quantities continued to move to western markets in crates. Celery has been shipped in cartons. A smaller seven-inch box for artichokes largely replaced the standard box used formerly. Several types of containers were widely used for tomatoes. Out-of-state shipments from the Delta and Oxnard district were mostly packed bulk, presized in wirebound crates of various weights, mostly around 60 pounds, for repackaging into consumer size tubes at other points. The two-layer flat gained popularity over the three-layer lug in local and northwestern markets. Increased quantities of strawberries were being shipped in colorful fiberboard trays.

The use of cartons for shipment of deciduous fruit was mostly in the experimental stage. At one time or another, experimental shipments of nearly all deciduous fruits were made in modified fiberboard cartons with wood ends. In most instances, the sizes of these containers closely approximated that formerly used.

The produce industry made further gains in the development of consumer size packages. This trend has been gaining slowly the past 10 years but in 1954 there was a noticeable shift toward prepackaging at shipping point. Apples, oranges, grapefruit, potatoes, and spinach were commodities commonly prepackaged at shipping point. Film bags also continued popular for celery, carrots, brussels sprouts, and limes.

Competition from the frozen food industry increased further, particularly for peas, lima beans, oranges, and other frozen products. Increased canning of apples in the Sebastopol area has materially reduced the importance of the fresh market for apples produced in that area.

The impact of gradually increasing amounts of produce being hauled to market by motor truck became pronounced in 1954. While not particularly a new development, the industry gave greater recognition to this means of transportation and attempted to solve some of the problems accompanying the changing transportation pattern. One of the problems affecting Market News Service was increased demands

from the industry for more complete and more timely information on motor truck shipments. Mixed loads containing small amounts of many commodities for shipment to smaller markets by truck gained further popularity.

California grows fruits and vegetables for both fresh market and processing outlets. The Market News Service does extensive work in the fresh marketing field. We also report on certain dried fruits, wine, grapes for crushing, and strawberries for freezing, but do not regularly report on the vast majority of the processing items. Comments herein refer primarily to developments in the marketings of the commodities we cover.

Market Places

California fruits and vegetables for fresh market use are consumed in large volume both within and outside the State. In 1954, rail and boat carlot shipments were 272,252 cars, nearly all of which moved to out-of-state points. Outbound truck shipments totaled 61,983 carlot equivalents. Unloads of California produce at Los Angeles, San Francisco, and Oakland totaled 123,428 carloads, a small part of which was redistributed to out-of-state points. While not definitely measurable, indications are that approximately one-third of the total California production of fresh market fruits and vegetables is consumed within the State and about two-thirds shipped out of State. This relationship has held fairly constant for a number of years past even though the population of California has increased substantially.

Los Angeles

Los Angeles maintained its position as the second largest city in the country in unloads of fresh fruits and vegetables. In continuation of the trend of the number of years past, unloads again increased and totaled 117,938 carloads (including truck, air, and boat receipts reduced to carlot equivalents). New York City was first with 191,663 carloads; Chicago was third with 75,375; and Philadelphia fourth with 66,953. Los Angeles unloads increased 4,403 carloads over 1953; New York decreased 9,930 carloads; Chicago decreased 1,195; and Philadelphia increased 239.

Truck receipts were equivalent to 102,983 carloads, or 87.3 percent of the total; rail 7.2 percent; boat 5.4 percent; and air 0.1; California supplied 95,119 carloads or 80.7 percent of the total receipts by all carriers; Central America 5.4 percent; Washington 2.8 percent; Idaho 2.8 percent; Mexico 2.3 percent; and other areas 6 percent. Greatest increases in volume over 1953 were shown in topped carrots, celery, romaine, parsley, peaches, tomatoes, and pears; and the greatest decreases in oranges, bananas, strawberries, potatoes, and bunched carrots.

The approximate wholesale value per car dropped to \$1,630, or \$30 less than 1953. Vegetables averaged \$1,230 compared with \$1,270 in 1953, and fruits, melons,

TOTAL UNLOADS AND APPROXIMATE WHOLESALE VALUE PER CAR OF IMPORTANT
FRUITS AND VEGETABLES AT LOS ANGELES, 1950 TO 1954

Commodity	Unloads, equivalent cars					Wholesale value per car				
	1954	1953	1952	1951	1950	1954	1953	1952	1951	1950
Potatoes.....	14,880	15,206	13,987	14,894	13,987	\$1,193	\$1,190	\$1,820	\$1,190	\$1,015
Tomatoes.....	10,660	10,091	9,198	8,729	8,279	1,801	1,870	1,995	2,000	1,909
Celery.....	9,277	8,117	7,534	7,065	6,379	668	720	820	780	*870
Lettuce.....	8,827	8,670	8,603	7,812	7,892	915	945	935	1,245	760
Bananas.....	7,001	7,775	6,494	6,168	5,983	2,680	2,725	2,790	2,785	2,810
Carrots ^c	4,639	3,109	3,019	3,020	2,863	1,440	1,285	1,335	1,445	1,030
Apples.....	4,444	4,206	4,522	4,455	4,496	3,525	3,600	3,190	2,790	2,400
Oranges.....	3,537	5,044	4,541	5,109	4,733	2,370	1,885	2,275	1,660	1,780
Watermelons.....	3,316	2,858	2,737	3,010	3,112	765	985	925	760	735
Cantaloups.....	3,309	3,007	2,908	3,463	3,167	1,210	1,200	1,120	1,025	1,000
Cabbage ^b	3,280	3,383	3,852	3,573	3,363	540	510	680	1,080	565
Corn.....	3,088	3,272	2,956	2,397	3,073	1,185	1,315	1,325	1,530	1,160
Onions, dry.....	2,855	2,390	2,686	2,740	2,594	860	1,135	1,910	1,060	720
Grapefruit.....	2,678	2,684	2,284	2,810	1,972	1,605	1,520	1,750	1,515	1,935
Peaches.....	2,647	2,095	2,376	2,277	1,951	2,335	2,385	2,120	2,430	2,065
Cauliflower.....	2,347	2,558	2,628	2,446	2,718	500	395	505	525	420
Others.....	31,153	29,070	29,385	28,341	26,972					
Totals.....	117,938	113,535	109,710	108,309	103,534	\$1,630	\$1,660	\$1,780	\$1,680	\$1,505

^a Based on different number of packages per car than later years.

^b Price estimate for white cabbage only.

^c Price estimate for bunched carrots only.

and berries averaged \$2,465 compared with \$2,460 in 1953. Tomatoes led in wholesale value with \$19,197,195; bananas second with \$18,759,845; potatoes third with \$17,752,105; and apples fourth with \$15,658,195. Other commodities with value of \$5,000,000 or more included oranges, lettuce, celery, peppers, peaches, snap beans, and table grapes. Price decreases were greatest proportionately on dry onions, watermelons, romaine, peas, sweet potatoes, corn, peppers, pears, garlic, table grapes, and lemons; and increases were greatest on cauliflower, oranges, strawberries, apricots, cherries, figs, topped carrots, bunched turnips, and bunched carrots.

San Francisco Bay Area

Receipts decreased slightly but the area held its position as the country's sixth largest fruit and vegetable marketing center following New York, Los Angeles, Chicago, Philadelphia, and Boston. Unloads totaled 37,873 carloads (including truck, air, and boat receipts reduced to carlot equivalents) or 313 below 1953.

Receipts at San Francisco have fluctuated within an unusually small range during the 24 years for which records are available. The heaviest was 1931, the first year in which combined rail, express, boat, air, and truck receipts were reported, when the total was 25,310 cars. The 1954 total of 21,500 cars, including 669 on the farmers' market, was the lightest of record, but only 14 less than the previous record light volume in 1949. Truck receipts accounted for 82.4 percent of the total. This was the highest percentage on record, although the actual volume was slightly less than in 1953, 1952, or 1951. Boat receipts, mostly bananas, amounted to 7.1 percent of the total. Rail receipts continued their steady decline and only 10.5 percent of the total volume arrived by rail. California again supplied the greatest part of the volume. The equivalent of 16,511 cars, or 76.8 percent of the total, was produced within the State. Central America was second with 1,461 cars, all bananas, or 6.8 percent of the total. Oregon was next with 1,324 cars, or 6.2 percent. Other important sources of supply were Arizona, Mexico, Washington, and Florida.

Unloads at Oakland were the equivalent of 16,373 cars, an increase of 205 over 1953, and the heaviest on record. Oakland remained the third largest fruit and vegetable market in the west, following Los Angeles, San Francisco, and ahead of Seattle, Denver, and Portland. Truck receipts constituted 78.7 percent of the total and rail 12.8 percent. Boat receipts accounted for 8.5 percent. California supplied 11,798 cars, or 72.1 percent of the total. Oregon and Central America were second and third, each with about 9 percent of the total. Arizona, Washington, Mexico, and Florida supplied most of the remainder.

Prices on the San Francisco wholesale market averaged about the same as in 1953, although there were many variations among the individual commodities. The trend toward lower prices which began late in 1952 and continued through 1953 was still in evidence during the first four months of 1954, but in May the trend was reversed and prices the rest of the year were mostly above those of the same months

TOTAL UNLOADS OF IMPORTANT FRUITS AND VEGETABLES AT SAN FRANCISCO AND OAKLAND, 1950 TO 1954

(Equivalent Cars)

Commodity	San Francisco					Oakland				
	1954	1953	1952	1951	1950	1954	1953	1952	1951	1950
Potatoes.....	2,713	2,732	2,714	3,046	2,807	3,148	3,051	2,798	3,038	2,374
Oranges.....	1,001	1,242	1,203	1,322	1,210	654	789	711	883	758
Lettuce.....	2,298	2,293	2,312	2,209	2,199	1,467	1,493	1,413	1,422	1,381
Tomatoes.....	1,473	1,546	1,452	1,474	1,419	1,005	1,027	899	1,003	843
Onions—dry.....	688	570	798	767	618	643	466	452	453	416
Apples.....	816	766	778	971	863	612	616	652	750	632
Celery.....	843	846	910	953	891	520	515	477	507	486
Bananas.....	1,572	1,681	1,532	1,543	1,520	1,450	1,453	1,298	1,271	1,123
Carrots.....	636	692	752	724	752	453	449	460	483	477
Cantaloups.....	639	591	612	670	700	450	398	372	365	395
Cauliflower.....	518	600	586	623	670	355	374	362	404	462
Grapefruit.....	538	517	542	581	501	316	279	289	324	233
Peaches.....	401	398	425	355	383	275	255	276	248	258
Others.....	7,364	7,544	7,637	7,486	7,594	5,025	5,003	4,877	4,812	4,682
Totals.....	21,500	22,018	22,253	22,724	22,127	16,373	16,168	15,336	15,963	14,520

in 1953. Commodities which were higher most or all of the year included asparagus, blackberries, oranges, Comice pears, Long White potatoes, sacked carrots, strawberries, and spinach. Among those which were lower most or all of the year were California Gravenstein and Northwestern Winesap apples, bananas, brussels sprouts, cantaloups, green corn, cranberries, Florida red potatoes, sweet potatoes, turnips, and watermelons.

Other California Markets

It is thought that most of the fruits and vegetables sold for fresh market use in California moved through the three primary terminals discussed previously, though a large tonnage is redistributed from these points to other markets both within California and in other nearby states. Around 25 percent of the Los Angeles unloads are redistributed. A large tonnage, especially of the major items of consumption and locally grown produce, moves through other large and small cities of the State and through peddlers, roadside stands or other retailers, direct sales, and the like.

It is evident that other terminal markets, particularly in such cities as Fresno, Sacramento, San Jose, and San Diego, are handling increasingly greater amounts though data on movement through these markets are not available.

Fresh Market Commodities

California originated 39 percent of the total United States rail shipments of fresh fruits and vegetables. We shipped 59 percent of the berries, 53 percent of the citrus fruits, 36 percent of the melons, 35 percent of the vegetables, and 25 percent of the deciduous fruits.

Total U. S. rail shipments of fruits and vegetables in 1954 was 694,413 carloads, 31,771 below 1953 and the lightest since 1920. California rail shipments of fruits and vegetables totaled 272,252 cars, 25,694 cars below 1953 but only 2 percent below the previous 20-year (1933-1952) average.

UNITED STATES AND CALIFORNIA RAIL CARLOT SHIPMENTS OF FRESH FRUITS AND VEGETABLES—1954 AND 1953

Commodity	1954			1953		
	U. S. cars	Calif. cars	Calif. % of U. S.	U. S. cars	Calif. cars	Calif. % of U. S.
Deciduous fruits.....	58,505	14,856	25	60,275	13,526	22
Grapes.....	27,073	26,826	99	25,662	25,330	99
Berries.....	3,428	2,016	59	3,470	1,760	51
Citrus fruits.....	101,597	53,375	53	117,080	69,682	60
Vegetables.....	439,294	151,808	35	461,928	166,987	36
Melons.....	64,516	23,371	36	57,769	20,661	36
Totals.....	694,413	272,252	39	726,184	297,946	41

CALIFORNIA INTERSTATE TRUCK PASSINGS OF FRESH FRUITS AND VEGETABLES 1954 AND 1953

(Equivalent Carloads)

Commodity	Outbound		Inbound	
	1954	1953	1954	1953
Deciduous fruits.....	3,626	3,036	5,817	5,675
Grapes.....	4,360	3,624	a	a
Berries.....	181	119	a	a
Citrus fruits.....	12,132	12,252	2,924	2,965
Avocados.....	420	525	a	a
Other fruits.....	139	188	1,108	1,081
Vegetables.....	36,383	35,937	10,252	8,905
Melons.....	4,503	5,008	1,829	1,919
Totals.....	61,744	60,689	21,930	20,545

a Included with other fruits.

Truck shipments of California fresh market produce continued to increase. The equivalent of 61,744 rail cars was shipped out of State by truck, 1,055 more than in 1953. Truck shipments represented 18 percent of the total out-movement. Grapes accounted for most of the increase though deciduous fruits and vegetables increased slightly. Melons registered the only noticeable decrease. Inbound truck shipments totaled 21,930 carlot equivalents, 1,385 above 1953. Most of this gain was in the vegetable group. The volume shipped in was about one-third that shipped out, the same relationship as has prevailed for the past four years. (See table, page 313.)

Rail unloads of 10 major California fresh fruit and vegetable commodities in 100 major markets of the United States totaled 176,996 cars. Over-all, this was a decrease of 17,145 cars, though five of the items showed an increase. New York took 25,707 carloads of these 10 items, Chicago 15,994 carloads, and Philadelphia 10,832 carloads. Detroit, Boston, Pittsburgh, and Cleveland were next in order, each getting over 5,000 cars. These seven cities took 82,544 cars or 35 percent of California's shipments of these 10 items; 93 other cities took 94,452 cars or 40 percent; and the remainder of the United States and other countries or territories took 59,468 cars or 25 percent.

**CARLOT UNLOADS OF MAJOR CALIFORNIA FRESH FRUITS AND VEGETABLES
IN MAJOR CITIES—1954**

(Carlots Only)

City	Lettuce	Oranges	Potatoes	Grapes	Lemons	Celery	Carrots	Cantaloupes	Mixed Veggies.	Tomatoes
New York.....	4,369	3,958	971	4,995	2,016	1,605	1,924	4,391	440	1,038
Chicago.....	4,039	2,265	1,926	1,864	727	1,507	1,039	1,552	434	641
Philadelphia.....	2,504	1,367	412	1,454	890	1,502	609	1,594	139	361
Detroit.....	2,202	1,592	1,287	974	417	879	524	537	234	207
Boston.....	1,762	1,766	498	1,599	438	630	429	965	93	639
Pittsburgh.....	1,615	1,169	492	972	323	864	172	737	159	126
Cleveland.....	1,578	893	668	598	301	588	189	688	207	10
Minneapolis-St. Paul.....	1,075	846	749	250	153	694	224	257	185	134
St. Louis.....	1,488	757	416	424	371	517	171	312	223	206
Cincinnati.....	1,132	377	226	432	292	423	145	438	261	79
Baltimore.....	1,032	355	119	413	379	428	201	447	97	132
Kansas City.....	838	192	589	141	108	378	222	279	72	248
Los Angeles.....	43	-----	1,926	38	-----	18	244	88	41	11
New Orleans.....	644	43	222	223	144	98	39	185	123	94
Washington, D.C.....	900	109	58	171	146	149	91	415	57	112
Atlanta.....	832	37	146	304	403	55	73	183	33	43
Dallas.....	673	45	725	28	93	14	9	49	17	155
Seattle.....	79	236	691	107	47	167	131	138	10	56
Denver.....	303	10	289	17	37	51	79	90	36	172
Portland, Ore.....	27	122	468	71	23	61	39	69	5	32
Oklahoma City.....	221	22	228	23	12	24	2	40	9	52
San Francisco.....	8	7	648	63	-----	15	28	30	1	1
Oakland.....	7	9	586	-----	-----	-----	13	12	-----	2
Fort Worth.....	142	6	172	-----	14	16	5	14	6	51
76 other U.S. Cities.....	18,411	5,227	8,916	6,112	3,984	4,926	2,083	5,004	2,011	1,350
Total 100 cities.....										
From California.....	45,924	21,400	23,428	21,273	11,318	15,609	8,685	18,514	4,893	5,952
From other states and countries.....	16,883	15,636	111,311	373	72	8,016	6,218	13,645	10,276	14,898
Percent from California.....	73	58	17	98	99	66	58	58	32	29
California rail shipments.....	55,577	37,208	35,942	26,826	13,821	17,809	10,342	21,026	10,108	7,805
Percent unloaded in 100 cities.....	83	58	65	79	82	88	84	88	48	76

While shipping heavily to other states, we produced nearly all our needs except for a few items. In contrast with the 123,428 carloads of California produce unloaded at Los Angeles, San Francisco, and Oakland in 1954, other states or countries sent only 32,383 carloads to these three markets. If available, data for smaller cities probably would show similar relationships. Major fruits and vegetables imported into California include bananas from Central and South America and Mexico; potatoes and onions from Idaho, Oregon and other nearby states; apples from the Pacific Northwest; tomatoes and other vegetables from Mexico; citrus, lettuce and melons from Arizona; and winter vegetables from Florida.

DECIDUOUS FRUITS

Fresh market prices for major California deciduous fruits were somewhat irregular but as a whole averaged very similar to 1953. Apricots, cherries, freestone peaches, winter pears, and plums sold at fresh markets brought higher prices but apples, figs, and Bartlett pears brought lower prices. Sales to canning and dried outlets brought prices mostly above 1953. Total production of all deciduous fruits was 1 percent above 1953 and the total value 2 percent above. The 18,482 carloads sent to out-of-state markets by rail and truck were 12 percent over 1953. Truck receipts of California deciduous fruits at Los Angeles, San Francisco, and Oakland, equivalent to 8,104 cars, were 15 percent over 1953.

California rail shipments of deciduous fruits increased 1,330 cars or 10 percent over 1953. This was largely due to a 66 percent increase in pears and a 76 percent increase in nectarines as shipments of all other deciduous fruits were below 1953. Out-of-state rail movement of deciduous fruits for the crop year through December 31 was 13,334 carloads, 78 more than for the same period in 1953. In addition, 1,447 cars of Bartlett pears, 44 cars of Winter Nelis pears, and one car of apricots were shipped out of State to processors. Approximately 30 cars were destined to cities within the State.

UNITED STATES AND CALIFORNIA RAIL SHIPMENTS OF DECIDUOUS FRUITS—1954 AND 1953

Commodity	1954			1953		
	U. S. cars	Calif. cars	Calif. % of U. S.	U. S. cars	Calif. cars	Calif. % of U. S.
Apples.....	23,303	307	1	22,746	345	2
Apricots.....	842	344	41	943	497	53
Cherries.....	2,263	626	28	2,231	809	36
Nectarines.....	571	571	100	324	324	100
Peaches.....	11,351	3,553	31	12,737	3,629	28
Pears.....	14,124	5,928	42	13,068	3,563	27
Plums and prunes.....	4,718	3,160	67	6,980	3,976	57
Mixed deciduous.....	1,333	367	28	1,246	383	31
Totals.....	58,505	14,856	25	60,275	13,526	22

California outbound truck shipments were 16 percent above 1953 with only apples, apricots, and cherries showing lighter volumes. Inbound truck shipments, chiefly apples, increased 2 percent.

CALIFORNIA INTERSTATE TRUCK PASSINGS OF FRESH DECIDUOUS FRUITS
1954 AND 1953
(Equivalent Carloads)

Commodity	Outbound		Inbound	
	1954	1953	1954	1953
Apples.....	664	681	5,401	4,780
Apricots.....	78	99	a	a
Cherries.....	45	48	36	7
Nectarines.....	188	110	a	a
Peaches.....	1,395	1,135	55	117
Pears.....	685	451	325	771
Plums.....	547	493	a	a
Persimmons.....	10	8	a	a
Pomegranates.....	14	11	a	a
Other deciduous.....	a	a	a	a
Totals.....	3,626	3,036	5,817	5,675

a Included with other fruits and not included in totals shown here, as data not segregated as to deciduous, citrus, etc. See preceding table of truck passings by groups of commodities.

Weekly average auction sale prices for six major California deciduous fruits shown in the following table illustrate the level and trend of prices in 1954. Auction sales of these six items in 10 eastern cities totaled 5,460,163 packages, a decrease from 1953 of 7 percent in volume, and 2 percent in gross value. Volume of apricots decreased 33 percent, apples 44 percent, cherries 25 percent, and plums 19

percent while nectarines increased 65 percent, pears 11 percent, and peaches 3 percent. Approximately 89 percent of the interstate rail shipments of nectarines, 84 percent of the apricots, 78 percent of the cherries, 54 percent of the plums, 47 percent of the pears, 13 percent of the apples, and 11 percent of the peaches were sold at auction.

**CALIFORNIA DECIDUOUS FRUITS—WEEKLY AVERAGE PRICES ON 10 EASTERN
AUCTIONS—1954 AND COMPARABLE WEEK 1953**
(Dollars per Package)

Week ending	APRICOTS				CHERRIES			
	Royal		Tilton		Bing		Tartarian	
	1954	1953	1954	1953	1954	1953	1954	1953
	Lugs				Campbell lugs			
May 8.....	----	----	----	----	----	----	----	\$10.60
May 15.....	----	----	----	----	----	----	----	6.47
May 22.....	----	----	----	----	----	\$8.11	\$4.64	5.81
May 29.....	----	\$8.61	----	----	\$6.98	7.84	4.03	5.75
June 5.....	\$7.23	6.82	----	----	6.90	6.42	4.03	4.14
June 12.....	5.05	5.79	----	----	6.21	6.62	3.62	4.28
June 19.....	4.48	4.15	----	----	6.88	6.05	6.37	4.13
June 26.....	4.14	2.83	----	----	7.46	6.52	----	----
July 3.....	3.50	2.10	\$3.22	\$2.39	6.71	5.20	----	----
July 10.....	2.82	2.36	3.80	3.24	----	----	----	----
July 17.....	3.14	3.90	4.63	4.19	----	----	----	----
July 24.....	2.93	3.95	4.53	4.30	----	----	----	----
July 31.....	----	3.37	----	3.46	----	----	----	----

Week ending	NECTARINES								APPLES	
	Gower		John River		Le Grand		Quetta		Gravensteins	
	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953
	Crates		Crates		Lugs		Boxes		Boxes	
June 19.....	----	----	\$5.43	\$6.78	----	----	----	----	----	----
June 26.....	----	----	3.27	5.22	----	----	----	----	----	----
July 3.....	----	----	2.20	3.98	----	----	----	----	----	----
July 10.....	----	\$4.65	3.07	3.65	----	----	----	----	----	----
July 17.....	\$4.70	4.04	4.48	3.27	\$7.39	\$6.72	----	----	----	----
July 24.....	3.89	3.29	4.80	----	5.69	7.99	----	----	----	----
July 31.....	3.04	3.35	----	----	5.25	5.44	\$2.38	\$3.44	\$4.33	\$4.90
Aug. 7.....	2.36	2.70	----	----	5.21	5.39	1.96	2.87	4.02	4.75
Aug. 14.....	----	2.20	----	----	4.27	4.46	1.91	2.50	4.05	5.05
Aug. 21.....	----	----	----	----	3.93	5.14	2.46	2.66	4.20	5.03
Aug. 28.....	----	----	----	----	4.31	6.79	2.46	3.60	4.00	4.35
Sept. 4.....	----	----	----	----	5.92	6.58	2.96	3.60	4.16	4.15
Sept. 11.....	----	----	----	----	----	7.18	----	----	2.98	4.66
Sept. 19.....	----	----	----	----	----	----	----	----	3.12	----

Apples: Prices averaged 22 percent lower than 1953 largely due to a 17 percent increase in California production. The national crop was 11 percent greater than the previous year. In California, production of Gravensteins was 41 percent larger than in 1953 while that of Newtowns was 29 percent larger. Hot dry weather late in June retarded the sizing of Gravensteins causing many growers to delay first pickings until late July. Interstate rail shipments of Gravensteins totaled 168 cars, the second lightest in 27 years of records. About 75 percent of the crop went to processors, including dryers. Harvest of Newtowns started in mid-September and was about to peak by mid-October. Fruit had good sugar content and was of good quality but sizes were below average. Russeting was heavier than in most seasons. Cold storage holdings in California on December 1, 1954, were the heaviest for that date since 1930. More than 85 percent of the state total was stored in the Watsonville-San Jose district.

Receipts at *Los Angeles* were 6 percent over 1953. Washington supplied 60 percent, California 23 percent, other states 15 percent, and Canada 2 percent. Wholesale values averaged 2 percent below 1953. Watsonville Pippins ranged 6-8½ cents January through March and 4½-9 cents October through December. Sonoma County Gravensteins brought 6-7½ cents in August. Washington Starking Delicious brought mostly \$5.25-6.25 January through April and \$5.25-6.00 October through December.

Receipts at *San Francisco* totaled 816 cars, 50 more than 1953. California supplied 387 cars with the Watsonville district originating over 50 percent, the Sebastopol district 25 percent, and other California districts 25 percent. The Northwest, principally Washington, supplied 421 cars and Canada eight cars. All receipts were by truck except for the eight cars from Canada. Wholesale prices for California and Oregon Newtowns were above 1953 early in the year but ranged the same to slightly lower late in the year because of the large California crop and heavy offerings. Sonoma County Gravenstein prices were below 1953. Washington Red Delicious ranged slightly higher to slightly lower and Winesaps were the same to slightly lower.

Apricots: Auction prices of California apricots in 1954 were above 1953 but below 1952. Highest prices were received the first week when Royals brought \$7.23 per package. Prices declined to \$3.59 in the fifth week, then picked up to \$3.81 the last week of the season. The season average price of \$4.19 per lug for Royals was the second highest in 20 years, being exceeded only in 1952. This compared with \$3.41 per lug in 1953. The average price of Tilttons was \$4.03 per lug, the highest average in 20 years of records, and compares with \$3.82 received in 1953. First rail cars were shipped May 30. The shipping season started a week later, peaked a week earlier and closed a week earlier than in 1953. The volume of California apricots sold at auction was 34 percent smaller than last year and the smallest since 1945. The volume of Royals, the most important variety, was 43 percent smaller while that of Tilttons was 5 percent larger.

Cherries: Auction prices averaged about 4 percent below 1953 due in part to small size cherries. Quality and size of Bings was very good and sales averaged

CALIFORNIA DECIDUOUS FRUITS—WEEKLY AVERAGE PRICES ON 10 EASTERN

AUCTIONS—1954 AND COMPARABLE WEEK 1953—Continued

(Dollars per Package)

[illegible]

\$6.76 per Campbell lug compared with \$6.44 last year. Small sizes predominated in other varieties and contributed to lower prices. Chapmans averaged \$3.48 compared with \$4.97 and Tartarians \$4.09 compared with \$5.30. The number of packages of cherries received on auction markets totaled about 25 percent below 1953. Of the volume received in Campbell lugs, 62 percent were Bings, 26 percent Tartarians, 5 percent Chapmans, 5 percent Lamberts, and 2 percent other varieties. The shipping season started a week later, peaked a week later, and closed a week earlier than in 1953. A total of 621 cars were shipped, 23 percent less than last year. Light rain fell in the Santa Clara Valley June 8, 9, and 12, interfering with picking but caused little damage. Processors paid higher prices than in 1953, paying 14 cents per pound in the Stockton-Lodi area for Royal Annes, Bings, and Lamberts, and mostly 16 cents per pound in the Santa Clara Valley for Royal Annes and Bings. Processors took practically all the Royal Annes but only a few Bings.

Nectarines: Auction prices averaged \$3 per package, 79 cents below the record high auction average of \$3.79 in 1953. Increased shipments contributed to the lower prices. Interstate rail shipments totaled 548 straight loads and 136 carloads of mostly nectarines. Straight loads increased 82 percent over last year. Outbound truck shipments totaled 188 carlot equivalents. Eastern auctions sold 609,255 packages of California nectarines, 65 percent above 1953 and the largest total since 1944. John Rivers increased 104 percent, Quettas 89 percent, but Gowers decreased 17 percent. Truck receipts at Los Angeles, San Francisco, and Oakland increased 26 percent while interstate rail shipments increased 70 percent.

Pears: Prices at auction averaged the highest since 1935. Bartletts constituted 81 percent of the total and brought an average of \$5.25, seven cents above 1953 and highest since 1935 except for the small volume in 1948. Sales of winter pears at auction were 42 percent above 1953 due principally to the 148 percent increase in sales of Bosc. All winter varieties showed a marked increase in average price. Comice averaged \$5.16, up 43 percent, Bosc \$4.79, up 27 percent, and Anjous \$4.48, up 20 percent compared with 1953. Fresh market buyers met strong competition from canners who eventually took a record 247,700 tons of Bartletts and 30,000 tons of other varieties according to preliminary estimates. Heavy freezes in the Northwest created a strong demand for California pears which were of fine quality.

Plums: Prices were up moderately from the low levels of 1953. Eastern auction prices for the 1,856,226 packages of all varieties combined averaged \$4.55 per package. This was 14 percent above 1953 and the highest of record except in the short crop year of 1952. Twenty-seven percent of the auction sales were Santa Rosas, 5 percent late Santa Rosas, 17 percent Beauties, 7 percent Duartes, 4 percent Late Duartes, 7 percent Presidents, 4 percent Wicksons, and 29 percent miscellaneous varieties.

Light crops in the Northwest created a strong demand which was maintained throughout the season. Sizes of Santa Rosas were smaller than usual but other varieties sized normally. Mid and late season varieties set light crops and total production of all varieties was 16 percent below 1953 and 10 percent below average. Interstate rail shipments totaled 2,988 straight cars, about 19 percent below 1953. Mixed cars of mostly plums totaled 291. Truck shipments to out-of-state points increased 11 percent but receipts at Los Angeles, San Francisco, and Oakland were nearly the same as in 1953.

Quality, size and characteristic color was considered unusually good in the *Central San Joaquin Valley*. This was particularly true of the Beauties. Demand for early varieties held steady to good, in line with the pattern of supplies. Mid-season and late varieties were in short supply and consequently found an active demand. F.o.b. prices were reported during the relatively short shipping season on only the commercially important Beauty and Santa Rosa varieties. F.o.b. prices on Beautys opened the season at \$5 per four basket crate, 5 x 5 base size. A premium of 50 cents additional prevailed for each larger size. Prices dropped sharply to \$3.50 base then gradually declined to \$2.50, reaching \$2.25 at close of season. Seasonal f.o.b. prices on Beautys averaged approximately 15 cents below the 1953 simple averages. Santa Rosas sold at shipping point averaged approximately 18 cents per package above 1953. F.o.b. values on the miscellaneous varieties ranged firmly in the \$3.00-4.00 level.

Peaches: California's 1954 freestone peach crop of 290,000 tons, 12 percent higher than the previous year, and the third largest of record since 1944 and 1946, returned an average of \$63.40 per ton, \$4.80 above 1953. Carlot interstate rail shipments in 1954 declined 3 percent but interstate motor truck movement increased 19 percent for a total out-of-state movement of 4,923 carlot equivalents compared with 4,755 in 1953. The excellent quality of the 1954 crop coupled with increased restrictions covering shipping maturity resulted in generally sound condition on arrival at destination. Further evidence of the high quality of California peaches was reflected in the steady repeat demand from major and secondary terminal markets.

Preseason estimates indicated below average production in major competing areas, and a bumper California crop of high quality. Nevertheless, California peach growers found the 1954 marketing season rather disappointing. Market demand, while consistently steady, found pressure from surplus supplies strong enough to depress f.o.b. prices as the season progressed. Harvest of the 1954 crop started approximately one week earlier than in 1953. Initial f.o.b. sales on Early Elbertas opened June 25, at \$1.50 per peach box, wrapped, U. S. No. 1 grade, 70s and larger. Excess supplies quickly forced prices down to \$1.15-1.25 and continued to the season's low of \$1. At this level demand improved and prices gradually strengthened to close the season at \$1.25. Simple average f.o.b. price for the 1954 season approximated \$1.18 compared with \$1.19 in 1953. Regular Elbertas opened the season July 19, one week earlier than in 1953. Initial sales on wrapped U. S. No. 1, 70s and larger, opened at \$1.35 per peach box. Prices held steady during the first week, but declined steadily to range around \$1.00-1.10. J. H. Hales followed a similar pattern, opening at \$2.75 per Sanger lug, U. S. No. 1, 65s and larger, gradually declining to close at \$1.65-1.75. Rio Oso Gems ranged fairly steady at \$1.75-2.00 per Sanger lug.

An increasing trend toward individual paper cup packing was noted. This was especially true of Pacific Coast market demand. For comparable f.o.b. price levels a premium charge of 25 cents to 75 cents additional prevailed for this type packaging depending on supply and demand factors.

**PEACHES—WEEKLY AVERAGE F.O.B. PRICES IN CENTRAL CALIFORNIA SHIPPING DISTRICTS
1954 AND COMPARABLE WEEK 1953**

(Dollars per Package)

Week ending	Early Elberta ^a		Elberta ^a		J. H. Hale ^b		Rio Oso Gem ^b	
	1954	1953	1954	1953	1954	1953	1954	1953
June 26.....		\$1.53	---	---	---	---	---	---
July 3.....	\$1.06	1.03	---	---	---	---	---	---
July 10.....	1.22	1.02	---	---	---	---	---	---
July 17.....	1.28	---	---	---	---	---	---	---
July 24.....	---	---	\$1.35	\$1.38	\$2.75	\$2.50	---	---
July 31.....	---	---	1.16	1.14	2.15	2.35	---	---
Aug. 7.....	---	---	1.05	1.10	1.76	---	---	---
Aug. 14.....	---	---	---	1.05	---	---	\$1.83	\$1.96

^a California peach boxes.

^b Sanger lugs.

Eastern auction prices for California peaches in boxes averaged one cent above 1953 while lugs averaged 10 cents below. Early Elbertas at auction averaged \$1.85 per package, up 15 cents from 1953; regular Elbertas \$1.53, up 19 cents; J. H. Hales \$2.44, down two cents; and Rio Oso Gems \$2.48, down eight cents. Slightly more than half the auction volume was in lugs due to increased shipments of J. H. Hales and Rio Oso Gems. Of the total packages sold at auction, 26 percent were Early Elbertas, 7 percent regular Elbertas, 35 percent J. H. Hales, 12 percent Rio Oso Gems, and 21 percent other varieties. Sales at auction totaled the equivalent of 402 cars, or 11 percent of the rail shipments.

Canners bought Early Elbertas at \$45 a ton roadside and regular Elbertas at \$50.00-55.00 per ton roadside.

Receipts at *Los Angeles* were 26 percent above 1953. The wholesale values averaged 2 percent lower. Most early varieties, particularly Merrill types, sold at high prices, bringing up the season average. Mayflowers brought 18-28 cents in May; Hales and Elbertas mostly 7-8 cents in July and August; and Rio Oso Gems from Yucaipa 9-13 cents in September.

Receipts at *San Francisco* were 401 cars, three more than 1953. Nearly 85 percent of the receipts came from the San Joaquin Valley, 12 percent from the Sacramento Valley, and 3 percent from the Northwest. Wholesale prices averaged similar to those in 1953.

GRAPES

Returns to California grape growers for the 1954 crop averaged 7 percent above 1953 and the highest since 1950 though the crop was 4 percent below 1953 and the lightest since 1942. Prices for raisin varieties for all uses averaged markedly above 1953; wine varieties slightly above; and table varieties moderately below 1953. Demand was fairly good for the light crop of raisin varieties, which had some effect on the demand for wine varieties, and was moderate for table varieties. Reserve and surplus pools for certain raisin varieties were in effect under the federal marketing order again this season. A reserve pool of 18 percent of the natural Thompson Seedless and 20 percent of the Golden Bleached raisins was established at the beginning of the season, with the remaining 80 and 82 percent being "free" tonnage. Later the reserve percentages were modified and some raisins were allocated to the surplus pool for export under the government subsidy program. Under the Tokay marketing order, grade requirements were made more rigid, and prorate quotas limited daily rail and truck shipments.

Interstate rail movement of fresh grapes through late February was 5 percent above 1953 to the same date, and had equaled the total 1953 rail movement. Increased shipments of Emperors more than offset the decreases in Thompsons and Tokays. Table grapes accounted for 74 percent of the movement, black juice 18 percent, and white juice 8 percent. Emperors and Thompson Seedless were the principal table varieties shipped, with Emperors regaining the lead in volume which was lost to Thompson Seedless last year. Interstate truck passings in the calendar year were 12 percent above 1953 and receipts at the three California terminal markets 4 percent above.

The marketing of old and new crop grapes overlapped for the first time of record when the first car of Perlettes was loaded in Coachella Valley on May 19 and Emperors were still in storage.

The following table gives a comparison of interstate rail shipments for the past three years.

CALIFORNIA INTERSTATE RAIL SHIPMENTS OF GRAPES
1952-1954 SEASONS THROUGH MARCH 15TH

(Cars)

	1954	1953	1952
Table varieties			
Almerias.....	196	198	640
Cardinals.....	447	255	269
Emperors.....	7,238	5,518	8,620
Red Malaga.....	737	593	924
Ribier.....	736	552	550
Thompson.....	6,246	6,744	6,899
Tokay.....	2,841	3,304	4,334
Other table.....	264	166	193
Total table.....	18,706	17,330	22,429
Juice varieties			
Alicante.....	1,674	1,712	1,761
Carignane.....	527	672	523
Zinfandel.....	1,722	1,798	1,972
Other Blacks.....	600	498	514
Muscats.....	1,991	2,189	2,052
Other Whites.....	37	21	73
Total juice.....	6,551	6,890	6,895

The general level and trend of prices for fresh market grapes are shown by the following table. Prices for raisins and for grapes crushed are shown elsewhere.

**GRAPES—WEEKLY AVERAGE F.O.B. PRICES IN CALIFORNIA SHIPPING DISTRICTS
1954 AND COMPARABLE WEEK 1953**

(Dollars per 28-Pound Lug)

Week ending	SAN JOAQUIN VALLEY								LODI	
	Red Malaga ^a		Ribier ^a		Thompson ^a		Emperor		Tokay	
	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953
July 24.....	\$2.75	-----	\$4.78	-----	\$4.22	-----	-----	-----	-----	-----
July 31.....	2.38	\$3.35	4.20	\$4.95	3.75	\$4.68	-----	-----	-----	-----
Aug. 7.....	2.07	2.78	3.10	4.30	2.80	3.60	-----	-----	-----	-----
Aug. 14.....	2.03	2.40	3.01	3.75	2.75	3.24	-----	-----	-----	-----
Aug. 21.....	2.08	2.14	2.74	3.10	2.28	2.52	-----	-----	-----	-----
Aug. 28.....	2.10	2.04	2.54	2.70	2.15	2.12	-----	-----	\$2.25	-----
Sept. 4.....	1.85	2.00	2.36	2.50	2.30	2.23	-----	-----	1.76	\$2.33
Sept. 11.....	-----	-----	2.35	2.26	3.66	2.25	-----	-----	1.65	1.78
Sept. 18.....	-----	-----	2.38	2.25	2.85	2.20	-----	-----	1.77	1.91
Sept. 25.....	-----	-----	2.38	2.04	2.75	2.02	-----	-----	1.64	1.74
Oct. 2.....	-----	-----	2.38	2.00	2.80	2.00	-----	-----	1.64	1.50
Oct. 9.....	-----	-----	2.50	2.07	3.38	2.00	\$1.80	-----	1.83	1.52
Oct. 16.....	-----	-----	2.58	2.29	-----	2.65	1.77	\$2.42	1.80	1.82
Oct. 23.....	-----	-----	2.78	2.42	-----	3.25	1.75	2.40	-----	2.10
Oct. 30.....	-----	-----	2.88	-----	-----	-----	1.75	2.40	-----	-----
Nov. 6.....	-----	-----	3.12	-----	-----	-----	1.84	2.40	-----	-----
Nov. 13.....	-----	-----	3.29	-----	-----	-----	1.94	2.70	-----	-----
Nov. 20.....	-----	-----	3.38	-----	-----	-----	2.02	2.62	-----	-----
Nov. 27.....	-----	-----	-----	-----	-----	-----	2.08	2.59	-----	-----
Dec. 4.....	-----	-----	-----	-----	-----	-----	2.24	2.56	-----	-----
Dec. 11.....	-----	-----	-----	-----	-----	-----	2.27	2.58	-----	-----
Dec. 18.....	-----	-----	-----	-----	-----	-----	2.35	2.45	-----	-----

^a Kern district forepart of season and Central California latter part.

Harvest of the 1954 grape crop in the *Southern San Joaquin Valley* area began two weeks ahead of the previous season. Above normal temperatures and humidity early in June contributed to the earlier harvest.

Supplies from the very onset of the season were heavy and in excess of the demand. Shippers were compelled to declare "picking holidays" during the season in order to balance supply with demand. Heavy accumulations on terminal markets, rather wide variation in quality, berry size, and sugar-acid ratio, and competition from ample supplies of deciduous fruits and melons were among the main factors influencing the downward trend experienced by both auction and f.o.b. sales.

Auction price averages for Red Malagas, Ribiers, and Thompson Seedless dropped steadily and at all times were below the 1953 level. F.o.b. prices reflected a weak market throughout the season. Prices declined steadily. F.o.b. sales for Thompson Seedless opened at \$4.50 per 28-pound display lug and closed the season at \$2.75; Red Malagas opened at \$3.25 and closed at \$1.90-2.00; Ribiers opened at \$4.75-5.00 and closed at \$2.85-3.00.

Grape growers in the *Central and Northern San Joaquin Valley* areas found the market outlook rather discouraging at the start of the 1954 harvest. Shipments moving toward terminal markets were heavy, auction price averages were declining, and f.o.b. prices on Thompson Seedless, Red Malagas, and Ribiers were weak. Shipments were curtailed as a means of balancing supplies to demand, after which f.o.b. prices gradually improved. In mid-September the extent of the light Thompson Seedless crop was fully recognized resulting in a definite improvement in market tone and demand. The strength the last half of the season was in contrast to the weakness of the first half.

Shipments of most varieties of table grapes were above 1953. Major exceptions were Thompson Seedless, down 7 percent, and Tokays down 14 percent. Emperor shipments to late February were approximately 36 percent above a comparable date of 1953.

F.o.b. prices in early August opened the season at \$2.75-2.85 on Thompson Seedless. This level held steady although trading activity ruled slow and dull until mid-

August when prices declined to the season's low of \$2.15. At this point the market trend reversed and prices advanced steadily to close the season at \$2.75 for fresh picked stock and \$3.25-3.50 on storage stock. Ribiers, in heaviest supply since 1944, found a fairly active demand throughout the season. F.o.b. prices were slightly above 1953. Prices opened at \$3.00-3.25, dropped gradually to \$2.25-2.50, held steady through September at \$2.35-2.40, advanced in October to \$2.50-2.75, and closed at \$3.00-3.25. Red Malagas opened at \$2.00-2.25, gradually eased downward to range \$2.00-2.15, mostly around \$2.10 and closed at \$1.85. Lady Fingers held firm throughout the season at \$2.75. Table Muscats held firm at \$2.50. Almerias were in good demand, possibly influenced by the short Thompson Seedless crop, and f.o.b. prices ranged upward from \$2.50-2.75 to close at \$3.00-3.25. The Emperor grape season was in direct reverse to the depressed 1953 season. Quality, size, grade and color of the 1954 crop was far superior. Demand and market conditions were noticeably better than in 1953. F.o.b. prices opened at \$1.75-1.85 per lug for U. S. No. 1 or better, \$2.00 on U. S. No. 1 extra, and \$1.40 for unclassified. This level prevailed with minor variations throughout the active fresh harvesting season which ended in early November.

The Emperor storage grape deal followed an active trading pattern. Speculative factors were unusually active during the early period of the season and substantial block sales for future delivery were consummated at \$2.25-2.50. F.o.b. sales of storage stock for prompt shipment with storage charges paid, opened the season at \$1.90-2.25 for U. S. No. 1 or better quality. Prices fluctuated both upward and downward through November depending on quality, grade and label. Prices advanced in December to range \$2.25-2.50 and continued to advance through January, reaching \$3.00-3.50 in February.

Fresh market juice grapes followed the same marketing pattern of recent years. Practically all sales were consummated enroute to destination or consigned directly to auctions. Shipments of both white and black juice varieties were slightly below the volume of 1953.

The *Lodi* Tokay deal was generally satisfactory. Auction prices averaged \$2.57, only 6 cents below 1953. Quality and volume of shipments were controlled under the Tokay marketing agreement for the sixteenth season. Grade requirements were made more rigid, making packs more uniform. Quality was much improved over 1953. Pack-out totaled 4,738,843 packages through October 24, slightly below 1953, though harvest was not hampered by rain as in the previous year.

Cold storage holdings totaling 583,301 packages on October 15 were nearly all sold by early December. Rail shipments totaled 2,841 cars, 14 percent below 1953. Both interstate and intrastate shipments were restricted to grapes having not less than 65 percent color and not more than 6 percent grade defects. Prorate quotas limited rail and truck shipments to 125 carlots daily.

Light movement got under way August 21, with active harvesting 10 days earlier than 1953. Volume f.o.b. trading opened August 26 at \$2.25, occasional \$2.50. A slow early demand was influenced somewhat by moderate offerings of Red Malagas selling at lower prices. Lack of active buying continued through the second week of September, gradually forcing values down to \$1.65. Late in this period a light volume went into storage because of an uncertain demand and grower resistance to sell at less than \$1.65. The market then strengthened to \$1.75 for a week but again fell, this time to the season's low of \$1.50 on September 24. Trading was accelerated at lower prices, then the market advanced. The last f.o.b. quotations in the second week of October ranged \$1.75-1.85. Many shipments at the close of the active shipping season were rolled unsold.

Receipts at *Los Angeles* were 4 percent above 1953 and included 1,977 cars of table grapes and 32 cars of wine varieties. Wholesale values averaged 5 percent below 1953. Coachella Valley Seedless ranged \$2.75-9.00 per lug, mostly \$3.75-4.25 in June; San Joaquin Valley Seedless \$3.50-6.00 in July, and \$2.00-3.25, mostly \$2.00-2.50 in August and September; and *Lodi* Tokays mostly \$2.00-2.25 in September and October. Prices were low for 1953 crop storage Emperors selling during January-May because of the heavy volume. These brought \$1.50-3.00 in January, 1954, \$.75-2.25 in February, \$1.00-1.75 in March, and \$.75-1.50 in April and May. Prices for 1954 crop Emperors ranged \$1.75-2.75 in November and \$2.25-3.25 in December.

CITRUS FRUITS

Prices realized for California citrus fruits in the 1953-54 season averaged above 1952-53 as increased returns to growers for oranges more than offset lower returns for lemons and desert valley grapefruit. The volume sent to out-of-state markets

in the calendar year 1954, as measured by rail shipments and outbound truck movement was 65,507 cars or about 20 percent below 1953 with a lighter orange crop the principal influence. Truck receipts of California fruit at Los Angeles, San Francisco, and Oakland were the equivalent of 8,525 carloads, or 18 percent under 1953.

Lemon harvest was abundant, second largest lemon crop ever produced, but orange yields varied widely from a normal crop in some areas to virtually a crop failure in others. As compared with the 1952-53 season, Navel orange production was off 12 percent and Valencia off 38 percent. Lemon sales were higher in volume but, because of cool summer weather in many populace areas, total returns were slightly less. Despite the reduced supply of Valencia oranges, export sales of the year were surprisingly good. Total overseas shipments during 1954 were almost 3,000,000 boxes of all varieties, and could have been greater had the Valencia orange volume been normal. For the first time in post war years, California citrus entered the markets of Great Britain, Ireland, and Norway. Bearing acreage of all citrus in 1953 was about 60,000 acres or 19 percent below 1947 primarily to make way for new homes and factories.

The following table shows the level and trend of prices during 1954.

**CALIFORNIA CITRUS FRUITS—MONTHLY AVERAGE PRICES OF ORANGES, LEMONS,
AND GRAPEFRUIT ON NEW YORK AUCTION AND OF GRAPEFRUIT ON
LOS ANGELES WHOLESALE MARKET—1954 AND 1953**

(Dollars per Box)

Month	NEW YORK AUCTION PRICES								Los Angeles ^a wholesale prices	
	Navel Oranges		Valencia Oranges		Lemons		Grapefruit		Grapefruit	
	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953
	Boxes		Boxes		Half boxes		Boxes		Boxes	
	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953
January.....	\$5.54	\$4.47	----	----	\$3.98	\$4.03	----	----	\$6.31	\$5.78
February.....	5.93	4.83	----	----	3.35	3.57	----	----	6.25	4.06
March.....	6.69	5.55	----	----	3.76	3.24	----	----	6.18	4.25
April.....	7.75	5.70	----	\$4.83	3.88	3.73	----	----	6.34	4.90
May.....	7.34	5.23	\$6.47	5.05	3.67	3.72	----	----	6.06	5.09
June.....	8.29	5.43	6.69	5.96	3.66	4.71	----	\$5.40	6.00	5.56
July.....	----	3.87	7.14	4.95	3.44	3.66	\$5.49	5.25	4.88	6.94
August.....	----	----	7.64	4.56	3.43	3.54	5.18	4.87	5.09	4.91
September.....	----	----	7.91	5.35	3.85	5.30	5.47	4.48	5.83	4.93
October.....	----	----	6.26	4.59	3.78	4.03	----	4.14	5.75	4.41
November.....	5.95	6.07	5.44	5.44	3.40	3.92	----	4.07	2.81	3.78
December.....	5.11	6.00	4.75	5.92	3.40	3.58	----	3.72	2.55	5.66

^a Simple average of Wednesday prices. 1954, Coachella Valley stock January through June; local stock July through October; Arizona stock November and December.

California rail shipments dropped 16,307 cars or 23 percent below 1953. This was the lightest rail shipment since 1925 with one exception in 1949. Oranges principally accounted for the reduced shipments.

UNITED STATES AND CALIFORNIA RAIL SHIPMENTS OF CITRUS FRUITS—1954 AND 1953

Commodity	1954			1953		
	U. S. cars	Calif. cars	Calif. % of U. S.	U. S. cars	Calif. cars	Calif. % of U. S.
Grapefruit.....	17,131	1,297	8	16,415	1,249	8
Lemons.....	13,902	13,821	99	13,344	13,241	99
Oranges and Satsumas.....	56,406	37,208	66	70,322	53,452	76
Tangerines.....	1,888	----	----	2,784	----	----
Mixed citrus.....	12,270	1,049	9	14,215	1,740	12
Totals.....	101,597	53,375	53	117,080	69,682	60

California outbound truck shipments showed little change compared with 1953 as increased volumes of oranges about offset lighter volumes of lemons. Inbound truck shipments declined only 41 cars.

CALIFORNIA INTERSTATE TRUCK PASSINGS OF CITRUS FRUITS—1954 AND 1953
(Equivalent Carloads)

Commodity	Outbound		Inbound	
	1954	1953	1954	1953
Grapefruit.....	611	471	2,038	2,406
Lemons.....	2,332	3,393	a	a
Oranges.....	9,189	8,388	886	559
Other citrus.....	a	a	a	a
Total citrus.....	12,132	12,252	2,924	2,965

a Included with other fruits and not included in totals shown here, as data not segregated as to deciduous fruits, citrus, etc.

Oranges: Prices received for California oranges in eastern auction markets in the 1953-54 season averaged well above 1952-53. Navels averaged \$6.32 per box for the 2,313,269 boxes auctioned and Valencias \$6.71 for the 3,281,023 boxes. Navels averaged \$5.13 and Valencias \$5.00 in 1952-53. Auction prices declined the last three months of 1954 marking a transition from the high level of prices for the short 1953-54 Valencia crop to a lower level for the large 1954-55 Navel crop. This decline carries prices in late December considerably under the level a year earlier. Wholesale prices at Los Angeles for the calendar year 1954 averaged 20 percent above 1953. Reports of the California Crop and Livestock Reporting Service show that returns to growers for the 1953-54 crop for all uses as \$2.49 per box for Navels and \$3.12 for Valencias. Returns for the 1952-53 crop were \$1.99 and \$1.68 respectively.

The federal export subsidy program was continued. A large volume of California Valencias moved to export channels particularly from the Central District. California orange acreage again declined following the trend of the past 15 years. Bearing acreage in 1953 was estimated at about 40,000 acres less than in 1938. Packing of oranges is swinging rapidly from the standard lidded box to the half box carton.

Receipts at *Los Angeles* were 29 percent below 1953. Loose, unlidded standard boxes comprised 82 percent of the unloads. Starting in April, the standard lidded box was almost displaced by the half box carton. Standard lidded Navels, 150 size, ranged mostly \$5.50-6.00 January through April; loose, unlidded standard boxes, 126-176 sizes, mostly \$3.25-5.25 January through April, and mostly \$2.75-4.25 in December. Half box cartons, 75s, ranged mostly \$2.50-2.75 in December. Half box cartons of Valencias ranged mostly \$3.25-3.75 June through October, \$2.50-2.75 in December. Loose pack standard boxes of Valencias ranged mostly \$4.25-5.00 June through October.

Receipts at *San Francisco* totaled 1,001 cars, down 241 cars from 1953. A light California crop, relatively high prices, and competition from frozen and canned juice accounted for most of the decline. The San Joaquin Valley and the Los Angeles area each supplied about half the receipts. Wholesale prices were slightly to well above 1953 levels except at the end of the year.

Lemons: Prices realized for California lemons in the 1953-54 season averaged well under the previous two seasons. Eastern auctions averaged \$7.44 per box for the 2,385,361 boxes auctioned during the 1953-54 season, (including half box cartons computed on a full box basis) compared with \$7.91 for the 2,498,958 boxes auctioned in 1952-53. Wholesale values at Los Angeles in 1954 averaged 5 percent under 1953.

The large crop caused the diversion of considerable portions to by-product channels at prices below 1953. The wide acceptance by consumers of lemon juice products brought about an all time record high consumption of lemons. Reports of the California Crop and Livestock Reporting Service show that returns to growers for all outlets was equivalent to \$2.86 per box compared with \$3.90 per box for the 1952-53 crop.

The half box carton has almost replaced the standard box for shipment. The lemon export program continued in effect and the Lemon Administrative Committee reported that 5 percent of the crop was sold for export, 43 percent for interstate shipment, 4 percent for intrastate shipment, 47 percent to by-products, and 1 percent miscellaneous.

Receipts at *Los Angeles* were 8 percent above 1953. The loose, unlidded standard boxes comprised 39 percent of the total receipts. Wholesale values averaged 5 percent below 1953. Half box cartons ranged mostly \$3.50-4.00 and loose, unlidded boxes \$5.00-5.50.

Receipts at *San Francisco* were 164 cars, 19 below 1953 and the lightest since 1938. About 85 percent originated in the Los Angeles area and 15 percent from Santa Barbara and the San Joaquin Valley areas. Wholesale prices the first seven months were the same to slightly higher than 1953 but were slightly lower the rest of the year.

Grapefruit: Returns to California growers in the 1953-54 season averaged slightly below 1952-53. Sharply lower prices for desert valley fruit more than offset the slightly higher prices in other sections. Reports of the California Crop and Livestock Reporting Service show average returns to growers as \$1.39 per box for Imperial and Coachella Valleys, and \$1.68 for other areas. This compares with \$2.12 and \$1.46 respectively in 1952-53. The wholesale value of all grapefruit on the Los Angeles market in the calendar year 1954 averaged 6 percent higher than in 1953.

Records of the Grapefruit Administrative Committee show that approximately 58 percent of the Imperial Valley and Coachella Valley grapefruit was sold within California, 5 percent shipped out of State, 34 percent processed, and 3 percent exported. Of the combined Arizona and desert valley crop, about 63 percent of the fresh shipments moved to California markets; around 4 percent each to Washington, Oregon, Missouri; 3 percent each to Utah and Texas; and 2 percent each to Ohio and Canada. Use of half box cartons for shipment of grapefruit started in the fall of 1954.

Receipts at *Los Angeles* totaled 2,678 carloads, nearly the same as in 1953. Coachella Valley supplied 43 percent, Arizona 37 percent, local districts 9 percent, Florida 5 percent, Imperial Valley 4 percent, and Texas 2 percent. Wholesale values averaged 6 percent above 1953. Arizona packed boxes brought mostly \$2.40-3.00 January through April and \$2.50-2.75 in November and December; Coachella Valley standard packed boxes mostly \$4.75-7.50 January through May and half box cartons \$2.25-3.50 in December. Local standard boxes brought \$5.00-6.50 in September and October.

Receipts at *San Francisco* totaled 538 cars, 21 more than 1953. Arizona supplied 40 percent, Coachella Valley 35 percent, the Los Angeles area and other California areas 20 percent, and Florida and Texas 5 percent. Wholesale prices the first half of 1954 ranged the same to slightly above 1953 while in the last half they ranged the same to slightly lower.

OTHER FRUITS

A few fruits sold in fresh market, some of major importance in California, do not fit into the preceding categories. Avocados and strawberries are outstanding.

Avocados: Prices realized for the 1954 California crop were slightly above 1953 while the crop was slightly lighter. Rail shipment data are not compiled. California outbound truck movement of 420 cars was 105 under 1953. Receipts of 966 carloads of California fruit at Los Angeles, San Francisco, and Oakland were 15 under 1953.

The level and trend of prices in 1954 are illustrated in the following table.

AVOCADOS—MONTHLY AVERAGE WHOLESALE PRICES AT LOS ANGELES^a
1954 AND 1953

Month	Fuerte				Nabal	
	1954	1953	1954	1953	1954	1953
	Dollars per lug	Cents per pound	Dollars per flat		Cents per pound	
January.....	\$6.53	.22	\$3.41	\$3.20	---	---
February.....	6.34	.21	3.38	2.98	---	---
March.....	7.05	.22	3.69	3.09	---	---
April.....	7.81	.26	4.09	3.58	---	---
May.....	8.63	.31	4.38	4.22	---	---
June.....	---	.36	---	4.56	.24	.24
July.....	---	---	---	---	---	.23
August.....	---	---	---	---	.31	.25
September.....	---	---	---	---	.33	.28
October.....	---	.32	5.06	4.75	---	---
November.....	---	.29	4.00	4.20	---	---
December.....	---	.23	2.45	3.33	---	---

^a Simple average of Wednesday prices.

Receipts at *Los Angeles* were 15 percent below 1953. Wholesale values averaged 7 percent above 1953. Fuertes in 24-26 count lugs brought mostly \$6.50-8.00 January through May and \$4.25-5.25 in December. Loose pack Anaheims brought 20-30 cents and loose Nabals 28-32 cents per pound in August.

Receipts at *San Francisco* totaled 150 carloads, seven less than 1953 and the smallest since 1950. Southern California supplied 137 and Florida 13. Wholesale prices were slightly higher than 1953 until near the end of the year when heavier new crop offerings caused prices to drop below those a year earlier.

Strawberries: Strawberries continued to establish new records in 1954. Acreage, production, value, movement to out-of-state fresh markets and to freezers were all greater than in any previous year. Yields per acre and use by local fresh markets, however, were below those of 1953.

California's acreage totaled 10,900 acres, an increase of 1,500 over 1953. Increases were largest in the Modesto and Watsonville districts, with fairly substantial increases in the Santa Maria district and the Santa Clara Valley, as well as smaller increases elsewhere. Production of 16,568,000 trays was 876,000 greater than the 1953 record. The yield of 1,520 trays per acre was 160 less than in 1953 but exceeded all other years.

Prices for fresh market berries averaged slightly higher than in 1953. There was a moderate to very good demand from out-of-state markets from the beginning of the active shipping season in early May to mid-June. For the next three or four weeks, demand was slow to moderate because of competition from Michigan and other producing areas close to the major consumption centers. By early July, these areas were about through for the season and demand for California berries improved but by this time the quantity of fruit suitable for distant shipping was becoming quite limited. The level and trend of prices during the active shipping season are shown in the following table.

**STRAWBERRIES—WEEKLY AVERAGE F.O.B. PRICES IN CENTRAL CALIFORNIA
SHIPPING DISTRICTS—1954 AND COMPARABLE WEEK 1953**

(Dollars per 12-pint Tray—University Varieties)

Week ending	1954	1953	Week ending	1954	1953
April 24.....	---	\$3.00	June 5.....	\$3.38	\$3.12
May 1.....	---	---	June 12.....	3.48	3.04
May 8.....	---	2.86	June 19.....	3.09	2.88
May 15.....	\$3.18	2.94	June 26.....	2.86	2.84
May 22.....	2.90	2.74	July 3.....	2.78	2.86
May 29.....	3.16	2.94	July 10.....	2.92	2.75
			July 17.....	2.97	2.94
			July 24.....	---	3.00

The shipping season began on April 16, when the first car moved from Oxnard. Santa Maria began on April 19, Fresno on April 23, Watsonville on April 26, Modesto on April 27, and the Santa Clara Valley on April 28. Rains on April 27 interrupted harvesting and affected shipping quality for several days. It was not until May 7 that carlot movement reached 10 cars daily but volume picked up rapidly and by the following week shipments were averaging about 40 cars daily. Toward the end of the month movement dropped off gradually to around 15-25 cars daily at which they held through June. Early July shipments ranged 12-18 cars a day and late July shipments were mostly 5-10 cars daily. Thereafter, shipments declined slowly. The last car was shipped on November 8. The Watsonville district with 858 cars, and the Santa Clara Valley with 756 cars, originated about 80 percent of the total carlot movement. A little more than 10 percent of the shipments were from Santa Maria, slightly more than 5 percent from Modesto, and the remainder were from Fresno, Florin, Victor, and Oxnard.

The practice of loading mixed cars of strawberries and other fruits and berries showed an increase over 1953. There were 112 cars of mixed strawberries and fruits in which strawberries were the predominating item, compared with 97 in 1953. Cherries were most commonly loaded in these mixed cars. Mixed car shipments of strawberries and raspberries increased substantially from 24 cars in 1953 to 72 in 1954.

Interstate truck shipments increased to the equivalent of 181 cars, the heaviest on record and more than 50 percent greater than in 1953. Much of the increase was to the Northwest, particularly to Seattle.

Movement to local markets was somewhat lighter than in 1953. The combined receipts at Los Angeles, San Francisco, and Oakland were equal to 1,287 cars, 377 less than in 1953 and the lightest since 1949. Competition from out-of-state markets during the active shipping season and from freezers during the later months probably accounted for much of the decline.

Freezing of California strawberries increased 3 percent over the previous record high established in 1953. The frozen pack, including added sugar, is reported at 96,473,000 pounds. Freezers putting up the vast bulk of the pack used 81,090,000 pounds of fresh berries. Deliveries were more evenly spread over the season than in 1953. Volume peaked the week ending July 3 when deliveries totaled 5,455,000 pounds or far less than the 1953 peak the week ending July 23 of 7,167,000 pounds.

Prices received by growers ranged mostly 15-17 cents per pound delivered, compared with 16-17 cents in 1953. They were about 1 cent below 1953 until the latter part of the season, and averaged slightly less. Prices were mostly 15 cents per pound from the beginning of harvest through July 4, 16 cents through September 25, then 17 cents until the end of the season. A good movement of frozen berries and demand from freezers for supplies to fill commitments were largely responsible for the advance to 17 cents late in September.

VEGETABLES

Prices received for California vegetables sold in fresh markets were irregular compared with 1953 principally reflecting varying supplies. Most commodities again tended toward the lower side but the degree of price change was comparatively

small. Asparagus, dry onions, and fresh spinach brought prices well above 1953 while celery and corn were noticeably lower. The total rail shipments and outbound truck movement, 187,943 carloads, was 7 percent under 1953. Truck receipts of California vegetables at Los Angeles, San Francisco, and Oakland, equivalent to 87,199 carloads were 6 percent over 1953.

California rail shipments decreased 15,179 cars or 9 percent under 1953 and the lightest since 1951. Outstanding was the sharp reduction in potato shipments, down 12,853 cars compared with 1953.

UNITED STATES AND CALIFORNIA RAIL SHIPMENTS OF VEGETABLES—1954 AND 1953

Commodity	1954			1953		
	U. S. cars	Calif. cars	Calif. % of U. S.	U. S. cars	Calif. cars	Calif. % of U. S.
Asparagus.....	1,196	1,163	97	1,409	1,359	96
Broccoli.....	2,371	2,189	92	2,175	2,052	94
Cabbage.....	9,925	594	6	11,154	728	7
Carrots.....	18,166	10,342	57	21,672	12,474	58
Cauliflower.....	4,379	2,600	59	3,769	1,940	51
Celery.....	28,724	17,809	62	28,231	17,351	61
Lettuce.....	77,267	55,577	72	79,474	57,705	73
Onions.....	22,578	3,665	16	24,549	4,248	17
Potatoes.....	206,279	35,942	17	224,338	48,795	22
Tomatoes.....	22,186	7,805	35	20,790	7,219	35
Mixed vegetables.....	24,264	10,108	42	24,445	10,429	43
Other vegetables.....	21,959	4,014	18	19,922	2,687	13
Totals.....	439,294	151,808	35	461,928	166,987	36

California outbound truck shipments were 446 cars above 1953. Increases in broccoli, cauliflower, celery, lettuce, onions, and tomatoes were nearly offset by decreases in asparagus, carrots, potatoes, and sweet potatoes.

CALIFORNIA INTERSTATE TRUCK PASSINGS OF FRESH VEGETABLES—1954 AND 1953

(Equivalent Carloads)

Commodity	Outbound		Inbound	
	1954	1953	1954	1953
Asparagus.....	239	302	a	a
Broccoli.....	270	205	a	a
Carrots.....	2,571	2,810	166	174
Cauliflower.....	1,344	1,266	7	11
Celery.....	4,222	3,892	7	7
Corn.....	880	816	189	188
Lettuce.....	9,320	8,412	1,125	1,019
Onions.....	420	372	989	822
Potatoes.....	3,649	3,766	5,749	4,922
Peppers.....	a	a	238	213
Sweet potatoes.....	436	497	39	15
Tomatoes.....	7,737	6,503	692	559
Other vegetables.....	5,155	7,096	1,051	975
Totals.....	36,383	35,937	10,252	8,905

a Included with other vegetables.

Lettuce: Prices averaged above 1953 except in the summer season. The Imperial Valley season was considered by shippers as only slightly profitable with prices averaging 25 cents above 1953. The disappointing summer deal in Salinas-Watsonville was offset by good returns in the early spring and early fall deals. The Santa Maria-Guadalupe deal was unfavorable because demand was lacking or quality was unsuitable for eastern shipment. Use of cardboard cartons for dry pack lettuce shipments continued to increase.

**LETTUCE—MONTHLY AVERAGE F.O.B. PRICES IN CALIFORNIA
SHIPPING DISTRICTS—1954 AND 1953**

(Dollars per Package)

Month	Imperial Valley				Salinas-Watsonville			
	4 dozen crates		2 dozen cartons		4 dozen crates		2 dozen cartons	
	1954	1953	1954	1953	1954	1953	1954	1953
January.....	\$3.90	\$2.60	\$1.91	-----	-----	-----	-----	-----
February.....	2.51	3.25	1.16	\$1.53	-----	-----	-----	-----
March.....	2.90	3.22	1.27	-----	-----	-----	-----	-----
April.....	-----	-----	-----	-----	\$3.18	\$3.26	\$1.58	\$1.64
May.....	-----	-----	-----	-----	4.46	3.05	2.45	1.51
June.....	-----	-----	-----	-----	2.51	2.76	1.12	1.32
July.....	-----	-----	-----	-----	2.32	4.86	1.08	2.44
August.....	-----	-----	-----	-----	2.53	4.45	1.40	2.40
September.....	-----	-----	-----	-----	2.80	3.99	1.52	2.10
October.....	-----	-----	-----	-----	3.74	4.42	2.15	2.31
November.....	-----	-----	-----	-----	4.72	3.12	2.39	1.49
December.....	-----	3.26	1.22	1.57	-----	-----	-----	-----

The 1953-54 *Imperial Valley* lettuce season was considered slightly profitable by some shippers but unprofitable by others. Time of harvest, yields, and quality influenced returns. Eastern terminal market response was varied, with several prolonged periods of sluggish movement and low prices. The increased use of cartons, the lack of demand for five dozen size, and increased competition from Texas were outstanding features of the season. About 81 percent of the rail loadings were packed in cartons, compared with 40 percent the previous season. Demand for five dozen size, except for a few occasions, was extremely slow with prices near packing costs. Competition from Texas was most severe in the southern terminal markets where Texas has the advantage of a relatively short truck haul. Formerly, a considerable volume was shipped to southern markets from the *Imperial Valley*.

Carlot shipments totaled 13,684 cars, slightly below the 13,937 cars the previous season as well as below the all time record of 14,530 cars in 1951-52. The first car was shipped November 16, the earliest on record.

Volume movement got under way the second week in December. Demand was good, especially for cartons one and one-half and two dozen sizes. Ice pack offerings were light because demand for this pack was limited to a few markets. Cold weather the last half of December and the first half of January held down the movement. Shipping point prices the first half of January advanced to the highest level of the season, reaching \$2.75 per carton dry pack twos, and \$5.50 per WGA crate ice pack fours.

With warmer weather and increased loadings in late January, the market trend was downward. Weather continued warm in February and the lettuce matured rapidly. Prices dropped to the season's low of \$1 for carton two dozens and \$2.25 for ice pack four dozens. Terminal market prices dropped to \$1.25-2.25 per carton dry pack twos, with a very few higher. Demand in this period was limited to the best quality.

Warm weather continued a factor in March. Some of the fields planted for March shipment had been cut in February. The market showed some strength in early March but as the spring crop in Arizona and Blythe got under way, *Imperial Valley* prices again declined.

The 1954 *Salinas-Watsonville-Hollister* lettuce season averaged irregular. A prolonged dull summer deal was offset by good returns in the early spring and late fall. The outstanding development was the marked increase in the use of cartons. Estimates indicate that 74 percent of the carlot shipments were in cartons. Because of variation in quality and selective buying, prices ranged widely. Rail shipments totaled 37,964 cars, or 1,319 below 1953.

The spring deal started slowly because of light yields. Demand was good on the few best lots. Demand was best for cartons. Ice pack fives met a slow demand. The market held steady April to mid-May. With lighter offerings the last half of May,

prices advanced. Shipping point prices during the spring deal on two dozen cartons showed a wide range of \$1.35-3.10 and averaged around \$2.00-3.00 during the heavy marketing periods.

Heavier shipments and increased homegrown offerings caused the market to weaken in early June. A weak tone prevailed most of the month. Prices ranged from \$.90-1.65 for two dozen cartons. The market was dull most of the first half of July. Yields were heavy and sizes large. Lighter loadings and a slightly improved market was noted after mid-July. However, the market advance was temporary as prices soon declined and held at relatively low levels throughout most of August. Homegrown offerings, shipments from Colorado, and the abundance of other fresh fruits and vegetables were weakening influences. Shipping point prices in August ranged \$.85-1.75 for cartons.

The fall deal brought an improved situation resulting from better movement in terminals and moderate loadings from the district. Prices advanced in late September, and reached the season's high of \$3.50 per two dozen carton in early October. Rains in Texas retarded harvest there, and shipments from Idaho, Oregon, and other California producing areas were light. The market weakened in mid-October but regained strength in late October and early November. Rains curtailed harvesting early in November which resulted in a scarcity of terminal quality lettuce. Around mid-November shipments from Phoenix increased, bringing the Salinas-Watsonville-Hollister district season to a close.

The 1954 *Santa Maria-Guadalupe* season was generally unfavorable. Either quality was not suitable for eastern shipment or demand was absent. Most of the production was trucked to the Los Angeles area and to other points within the State. Rail loadings for eastern shipment were only 874 cars, compared with 1,481 in 1953. Use of cartons continued to increase and loadings in wooden crates were in the minority. Quality was too poor in April and May to offer for eastern shipment. Quality improved the latter part of June but demand was slow because of the liberal supplies from the Salinas area as well as homegrown stocks. Shipping point prices in June and July for two dozen carton pack ranged \$.90-1.25. The market was slightly stronger in August and September but still comparatively low, ranging \$1.00-1.50 for two dozen cartons. A fairly good Los Angeles market in October and November drew most of the supplies that way. Those shippers who had a late season production netted some profit but very few shippers had enough of this late harvest to overcome the earlier losses.

Receipts at *Los Angeles* were 2 percent above 1953. *Santa Barbara* and *San Luis Obispo* Counties supplied 39 percent, local districts 20 percent, *Imperial Valley* 14 percent, *Monterey* and *Santa Cruz* Counties 9 percent, other California districts 12 percent, and *Arizona* 6 percent. Wholesale values averaged 3 percent lower. *Imperial Valley* fours ranged mostly \$2.50-3.25 January through March and \$2.25-2.75 in December. *Santa Maria* fours fluctuated from a low of \$1.25 in July to a high of \$4.40 in October, mostly \$1.75-2.25.

Receipts at *San Francisco* totaled 2,298 cars, five above 1953 and the second highest of record. The Bay area originated about 50 percent, *Imperial Valley* 15 percent, *Salinas-Watsonville* 10 percent, *Arizona* 9 percent, *San Joaquin Valley* 7 percent, and *Blythe* about 5 percent. Wholesale prices averaged about the same as 1953 but fluctuated higher and lower. Receipts of romaine were the heaviest on record and totaled 360 cars. The Bay area supplied slightly more than half the total, *Santa Maria* district 15 percent, *Los Angeles* area 12 percent, *Imperial Valley* 10 percent, and other areas 13 percent.

Potatoes: Prices were up sharply from the depressed levels of 1953, particularly on early potatoes. These enjoyed a very satisfactory season, reflecting moderate supplies in contrast with the excessive supplies of 1953. Carry-over of California potatoes at the close of 1954 was slightly above that a year earlier.

The 1954 *Kern District* Long White potato season was generally profitable to growers and shippers. The season was characterized by good balance between supplies of potatoes and the demand, and a ready movement at prices satisfactory to all segments of the industry. Prices averaged between the extremely depressed prices of 1953 and the record high prices of 1952, though nearer the latter. A comparison of simple weekly average f.o.b. prices in the three seasons follows.

POTATOES—WEEKLY AVERAGE F.O.B. PRICES IN KERN DISTRICT
1954 AND COMPARABLE WEEK 1953

(Dollars per 100 Pounds—U. S. No. 1, Size A)

Week ending	Long Whites		Round Reds	
	1954	1953	1954	1953
April 24.....	\$2.31	\$2.90	\$3.75	\$3.91
May 1.....	2.30	2.27	2.95	3.40
May 8.....	2.79	2.55	2.60	3.15
May 15.....	3.36	2.32	3.12	3.00
May 22.....	3.20	1.95	3.31	2.28
May 29.....	2.66	1.42	2.74	1.75
June 5.....	3.31	1.31	2.96	1.72
June 12.....	2.97	1.49	2.63	2.22
June 19.....	2.89	1.28	2.52	1.78
June 26.....	2.79	1.16	2.72	---
July 3.....	2.60	1.14	---	---
July 10.....	3.54	1.34	---	---

Favorable market conditions in 1954 were influenced by greatly reduced acreage and production compared with 1953, both in the Kern District and other early competing areas; failure of harvesting in competing areas and Kern District to coincide; greatly increased confidence on the part of shippers and receivers compared with 1953; and industry regulations governing grade and maturity of Kern District white potatoes.

The Kern District operated under a state marketing order for white potatoes, first effective November 17, 1953. Objectives were to promote orderly marketing, to restrict sales to high quality potatoes, and to provide for advertising, sales promotion, and research. Grade regulations promulgated under the order prohibited shipment of potatoes below U. S. No. 2 grade, and shipment between June 14 and 30 of U. S. No. 1 size B. Maturity regulations restricted shipments from May 6 through the end of the season to potatoes meeting specified graduated minimum standards of maturity.

Supplies of potatoes both nationally and locally during the Kern District season generally were well in balance with the demand. Supplies generally were adequate for trade needs except for a period of about three weeks early in the season and never were burdensome. Carry-over of old crop was heavier than in 1953, but decreased production in early areas more than offset the increase.

Planted acreage was greatly reduced from 1953 because of unsatisfactory prices in that year. Kern District planting were 43,000 acres, down 20,100 from the 63,100 of 1953 according to estimates of the California Crop and Livestock Reporting Service. Shipments to market amounted to 28,750 carloads—21,163 by rail and 7,587 carlot equivalents by truck or 9,448 cars below 1953. Truck movement, however, was only 738 carlot equivalents below 1953 and otherwise was the heaviest of record.

First cars were shipped April 6, the same as in 1953. Very limited truck movement had started several days earlier. Buildup was very slow. Daily shipments did not reach the 100-car mark until 27 days after the start, compared with 23 days in 1953 and only eight days in 1952. All sections were harvesting by May 18. Shipments increased very slowly and did not reach the 500-car mark until June 4, 17 days later. In 1953 they reached this level only eight days after harvesting became general.

Heaviest harvesting was May 31 to July 3. The peak rail shipping day was July 24 with 646 cars. This unusually late peak date was due to below-normal temperatures in late May and early June. Peak day was June 11 in both 1953 and 1952, with 901 cars and 1,024 cars respectively. Kern District originated 67 percent of the Nation's rail shipments of early potatoes in the period May 31 to July 3, compared with 70 percent in 1953. Rail unloads of 17,762 cars of California potatoes at 100 cities from April through July were 6,011 less than in 1953 reflecting the decreased production.

Market demand for Kern District potatoes developed slowly. It was only fair until April 28. It exceeded available supplies from that date until May 17; averaged moderate to good until May 31; then averaged good for best quality and ranged light to good for other offerings.

Opening prices April 20 were \$2.50 for 100-pound sacks of U. S. No. 1 size A. Although shipments were light the trade was slow in accepting offerings from this district and prices declined to the season's low of \$2.15 on April 27. Harvesting was curtailed on April 28 due to rain and demand exceeded the reduced offerings. Prices stabilized and reacted upward, continuing the trend until reaching \$3.50 on May 12 through 18. Heavier shipments caused prices to decline to \$2.50-2.65 by May 25. More rigid maturity requirements effective May 26 forced some growers to slow harvesting. With offerings reduced, prices advanced to mostly \$3.35 on June 2.

Increasing shipments caused prices to decline to \$2.65-2.75 on June 14. Many in the trade felt that the season's peak had been passed. Speculative demand until June 21 forced prices to \$3.00. Shipments continued heavy and sudden warm weather resulted in peak movement later than anticipated. Prices fell to \$2.50-2.60 on June 30. By July 1 only a limited acreage was left to be harvested and prices advanced sharply, reaching \$3.60-3.75 on July 9 when the season ended. In June there was a wide range in quality. Offerings of best quality were limited and they brought a premium ranging as high as \$1.15 over other stock.

Supplies of off-grades were on the market throughout the season. Prices for these generally followed the fluctuations of U. S. No. 1 size A. With the maturity regulations, there was an absence of immature potatoes on the market. Frequently in the past large quantities of immature potatoes have been offered, and have adversely affected a rising or good market.

In recent years an increasing part of the Kern District acreage has been Round Red potatoes. Offerings were available from the season's start until June 25. Prior to 1954 Red potatoes commanded a premium over Long Whites. The first week of the 1954 season they sold higher than Long Whites, but for the remainder they averaged slightly lower. In 1954 production was more than adequate to supply the limited demand.

High temperatures and rapid evaporation presented an irrigation problem in April. Many later fields yielded unusually large quantities of rough and misshapen potatoes, and heavy culling was necessary. In contrast with previous years, potatoes from the Edison section showed unusually good maturity. Records of the Federal-State Shipping Point Inspection Service indicate that 77 percent of the Kern District packout graded U. S. No. 1 size A, compared with 74 percent in 1953. Only 9 percent graded U. S. Extra No. 1 compared with 19 percent in 1953. Growth cracks and misshapes were responsible for most loss in grade and soft rot was more prevalent this year. Scab was not serious, probably because many of the infected fields were not planted.

Facilities for packaging in 10-pound paper sacks were expanded and offerings were available most of the season. Trade acceptance was good and offerings were generally placed with ease.

The *Santa Maria-Guadalupe District* shipped 472 rail cars and large amounts by truck. The crop was mostly Russets, marketed within California. Grower returns were small because of light yields and small sizes. First f.o.b. offerings early in August met a good demand and brought \$4.00-4.50 per cwt., U. S. No. 1 A. Heavier supplies by mid-month caused prices to decline to \$3.25-4.00 and by the end of August prices dropped to \$3.00-3.25. Demand was fair to moderate in September at \$2.75-3.25 but in October, under a diminishing demand, prices dropped to \$2.00-2.50. A large percentage of the crop sold as unclassified, bringing considerably lower prices.

Receipts at *Los Angeles* were 2 percent under 1953. California supplied 70 percent, Idaho 17 percent, and other states 13 percent. Wholesale values averaged practically the same as 1953. Idaho Russets U. S. 1 A ranged \$2.75-3.25 in January and February, \$2.25-3.25 in March and April, and \$3.25-4.00 in November and December; Kern County Long Whites U. S. 1 A ranged \$2.50-3.25 in April, \$3.00-4.15 in May, and \$3.25-4.50 in June; Perris Valley Long Whites U. S. 1 A ranged \$2.65-4.10 in July, \$2.75-3.75 in November, and \$2.00-3.25 in December; and Stockton Long Whites U. S. 1 A brought \$2.60-3.75 in September.

Receipts at *San Francisco* were 19 carloads less than in 1953 and the lightest of record. California, principally Kern, supplied 50 percent, Oregon 40 percent, Washington 5 percent, and various other states the remainder. Wholesale prices

for Russets were much lower during the first four or five months than in 1953, but were generally slightly higher the remainder. Long Whites were mostly from slightly to considerably higher, while Florida Round Reds were consistently a little lower.

Celery: Prices for California celery as a whole averaged slightly under 1953 though the winter deal in Chula Vista-Oceanside district brought sharply higher prices. Returns to growers from the late fall deal were also slightly above 1953 but grower returns from the spring deal were sharply lower and the early summer deal slightly lower than in 1953.

The level and trend of shipping point prices during 1954 are illustrated in the following table:

CELERY, PASCAL TYPE—MONTHLY AVERAGE F.O.B. PRICES IN CALIFORNIA
SHIPPING DISTRICTS—1954 AND 1953

(Dollars per Crate)

Month	Chula Vista		Venice		Salinas		San Jose		Stockton	
	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953
January.....	\$2.77	\$1.98	-----	-----	\$2.37	\$2.34	-----	-----	-----	-----
February.....	2.59	1.77	-----	-----	-----	-----	-----	-----	-----	-----
March.....	2.28	1.88	-----	-----	-----	-----	-----	-----	-----	-----
April.....	-----	-----	\$1.76	\$2.53	-----	-----	-----	-----	-----	-----
May.....	-----	-----	2.37	3.75	-----	-----	-----	-----	-----	-----
June.....	-----	-----	2.07	3.73	-----	-----	\$2.27	\$3.34	-----	-----
July.....	-----	-----	2.03	2.19	-----	-----	2.22	2.47	-----	-----
August.....	-----	-----	-----	-----	-----	-----	2.11	2.02	-----	-----
September.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
October.....	-----	-----	-----	-----	\$2.19	-----	-----	-----	-----	-----
November.....	-----	-----	-----	-----	2.22	-----	-----	-----	\$2.17	\$2.08
December.....	2.52	2.74	-----	-----	2.10	2.16	-----	-----	2.15	2.03

In *Southern California*, the Chula Vista-Oceanside celery deal was profitable for growers. Acreage was below 1953 and the quality of the harvest good. Delayed movement from Florida and rains in Southern California, which at times practically stopped harvest, contributed to a strong market by reducing the supply available in this period. Sturdy crates of 2-3 dozen sizes brought \$3.00 f.o.b. in late December; \$2.25-3.25 in January; mostly \$2.25-3.00 in February; and mostly \$2.00-2.50 in March. The 2½ dozen size was the most popular.

In the Venice district the season was unprofitable because of heavy Florida shipments. F.o.b. prices, 2-3 dozen, ranged \$1.50-2.35 in April; mostly \$1.50-2.60 in May; \$1.75-2.60 in June; and \$1.75-2.35 in July.

Rail shipments from Southern California during the Chula Vista-Oceanside deal December 1953-March 1954 totaled 2,960 cars, up 3 percent. During the Venice deal, April-July, rail shipments totaled 4,013 cars, up 10 percent. California out-bound truck movement was equivalent to 1,667 carlots December-March and 1,367 carlots April-July.

Harvesting in the *Santa Clara Valley* started in early June and continued into October. July was the peak month with average daily carlot shipments of around 25 cars. The early part of the season was rather unsatisfactory for growers because of small sizes and many seed stems. Some small acreages were abandoned during this period. Later maturing crops returned better prices.

Shipping point prices generally were under 1953 and fluctuated within a fairly narrow range. Demand, as in previous seasons, centered around the 2½ dozen size which brought the top prices. Straight cars of 2 dozen size were usually discounted. Prices for cars of mixed manifests of 2-3 dozen sizes brought \$2.25 late in June and advanced to \$2.35-2.50 in early July. Late in July prices dropped to \$2.15-2.25 and then advanced again early in August to \$2.25-2.50, but by this time the volume movement was over. At times, 3 dozens were mostly at or near the bottom of the range. Straight cars of 2 dozen sizes brought \$2.00 during late June, followed by a decline to \$1.90 during July and an advance to \$2.25 early in August.

Most *Santa Maria-Guadalupe-Oceano* celery growers realized a profitable year. Demand was sufficient to hold the market above cost of production most of the time though Michigan and New York competed during the summer months and other California districts competed during the Thanksgiving and Christmas holiday period.

Rail shipments totaled 3,094 cars, 18 percent above 1953. Acreage was larger and yield heavier than in 1953.

Summer celery started in mid-June at Oceano when demand was slow to fair. F.o.b. prices for 2-3 dozen ranged \$1.75-2.50 in June; \$1.90-2.50 in July; \$1.75-2.50 in August; and \$1.75-2.40 in September. The fall deal started in October with harvest active in all California districts. Demand, while slow in October, picked up in November-December. F.o.b. prices ranged \$1.65-2.35 in October; \$1.90-2.50 in November; and \$1.75-2.25 in December, rising to \$2.50-2.75 the last week of the year.

The *Salinas-Watsonville* fall celery deal gave better returns to growers than in 1953. Holiday demand was good and trading active on a strengthening market. Harvest of the fall crop continued from September through December with two-thirds of the shipments in November and December. Rail shipments to the end of 1954 were 2,906 cars, 63 more than 1953. F.o.b. prices for the season ranged \$1.75-2.50, mostly \$2.00-2.25.

Delta district celery prices were the same to slightly above the previous two seasons but shippers considered 1954 a "break even" year. Preliminary rail shipment figures total 2,288 cars, slightly above 1953, though acreage was 25 percent lower. The first shipment was made September 20 with light shipments continuing for a month and a half. Outbound truck passings appeared heavier though records are not available by California district of origin. Quality was generally good. Disease and frost damage was restricted to a small amount. December rains were heavier than normal.

Demand over-all was rather poor. A light demand prevailed until about November 10 when demand improved for Thanksgiving supplies. Demand continued good for a week then was slow until after the holiday. Thereafter, demand fluctuated from slow to moderate. The usual pre-Christmas interest was lacking, due in part to heavy daily rail shipments and increasing track holdings in terminal markets. Many cars were rolled unsold, most of which sold in terminal markets at prices below the prevailing f.o.b. level.

Shipping point prices for 2-3 dozen sizes ranged \$2.00-2.50 during November and December; straight 2s bringing mostly \$2.00, 2½-3s mostly \$2.15-2.50 in November, and \$2.00-2.25 in December. There was practically no demand for 3½-4s but there was good demand for the light volume of smaller sizes. Crates of 4½ dozen and smaller brought mostly \$2.25. A few cars of 5 dozen sizes brought \$2.50-2.75 during the middle of December.

Receipts at *Los Angeles* were 14 percent above 1953. About 56 percent was packed in lettuce crates. Film packing of celery hearts continued to increase in popularity. Wholesale values averaged 7 percent lower. Chula Vista sturdy crates, 2-3 dozen, brought mostly \$2.50-3.25 in January and February; Venice \$1.25-2.25 in April, \$1.40-3.25 in May, and \$1.00-2.25 in June; Oceano \$2.50-3.00 in August, \$2.65-3.40 in September, and \$2.25-2.75 in October.

Receipts at *San Francisco* totaled 843 cars, slightly under 1953 and the lightest since 1944. The Bay area originated 45 percent, Southern California 40 percent, the Salinas area 7 percent, and the San Joaquin Valley 7 percent. Wholesale prices fluctuated higher and lower than 1953 but averaged about the same.

Carrots: Market prices for carrots again were irregular. The winter crop in the Imperial Valley brought prices above 1953 as reduced acreage and rains in Texas created a good demand the last half of the season. The early summer crop also brought prices above 1953 but the prices for the late fall crop averaged well below 1953. Prepackaging at shipping point gained further popularity with trade estimates indicating that approximately 75 percent of the rail shipments from the Salinas-Watsonville district were packed in one-pound film bags.

The level and trend of f.o.b. prices are illustrated in the table, page 335.

In the *Salinas-Watsonville* district carlot shipments of carrots totaled nearly the same as 1953 though topped carrot shipments comprised 73 percent of the total compared with 47 percent in 1953 and 22 percent in 1952. The increase in topped occurred principally in cartons of 24 one-pound film bags though crates of 48 one-pound film bags continued most popular. A fair amount of topped carrots were shipped bulk, principally in 50-pound burlap bags, for repacking at receiving points.

Shipments beginning May 17 were light the first two weeks. Shipments were heaviest in June and July and topped carrot shipments were fairly heavy again in October and November. From the opening highs of \$4.00 on crates of six dozen bunches and \$4.25 on crates of 48 one-pound film bags in early June, the market declined rapidly to \$2.50-3.00 on bunched and \$2.75-3.00 on film bags throughout July-August. Prices advanced to \$3.50-3.75 on bunched and film bags in mid-September but again declined to mostly \$3.00-3.25 for the remainder of the deal except

**CALIFORNIA BUNCHED CARROTS—MONTHLY AVERAGE F.O.B. PRICES IN
CALIFORNIA SHIPPING DISTRICTS—1954 AND 1953
(Dollars per Crate)**

Month	Bunched—W.G.A. crates, Medium-Large				Topped—48 1-lb. film bags			
	Imperial Valley		Salinas-Watsonville		Imperial Valley		Salinas-Watsonville	
	1954	1953	1954	1953	1954	1953	1954	1953
January	-----	\$3.00	-----	-----	-----	-----	-----	-----
February	-----	2.49	-----	-----	-----	-----	-----	-----
March	-----	2.30	-----	-----	-----	-----	-----	-----
April	\$3.72	2.39	-----	-----	\$4.03	-----	-----	-----
May	3.82	2.56	-----	-----	3.76	-----	-----	-----
June	-----	-----	\$3.38	\$2.88	-----	-----	\$3.64	\$3.48
July	-----	-----	2.78	2.77	-----	-----	2.93	3.43
August	-----	-----	2.81	2.86	-----	-----	2.84	3.02
September	-----	-----	3.46	4.04	-----	-----	3.41	4.21
October	-----	-----	3.20	3.73	-----	-----	3.04	3.99
November	-----	-----	3.36	4.40	-----	-----	3.36	4.60
December	-----	-----	3.34	4.05	-----	-----	3.25	4.20

for a brief period of strength in mid-November at \$3.50-3.75 with a few sales of film pack bringing \$4.00. Competition from Texas and desert areas in December brought a slow demand and a weaker market.

Imperial Valley carrot prices averaged above 1953 especially during the latter half of the deal when heavy rains in Texas materially reduced competition from that area. Active f.o.b. trading did not start until April when rains in Texas created a good demand for Imperial Valley carrots. With acreage about 35 percent below 1953 and total rail shipments about 37 percent below, price levels held steady in April and May at mostly around \$3.75 per WGA crate, bunched, medium to large size. Comparable packs in the same period of 1953 ranged mostly around \$2.25-2.50.

Topped carrots packed in one-pound film bags gained popularity and were in better demand than bunched carrots. Market outlets for bunched carrots became rapidly restricted late in the season. Shipping point prices for crates of 48 one-pound film bags averaged \$4.03 in April and \$3.76 in May. Prices for this pack in 1953 ranged \$3.00-3.25, mostly \$3.00 per crate.

Rail shipments in the *Santa Maria-Guadalupe-Lompoc* district dropped to 186 cars, 35 percent below 1953. Fully half these cars went to processors and prepackage plants. Much of the crop was sold by the acre and not offered for fresh market consumption. Acreage has dropped the past few years due to high labor costs and the difficulty of keeping regular crews. Late in the year some carrots were packed locally in crates of 48 one-pound film bags. Demand for this pack was spotty and irregular, with f.o.b. sales ranging mostly \$2.75-3.25 October-December. A small profit was realized over the year.

Receipts at *Los Angeles* were 49 percent above 1953. The sharp increase partially reflects a more complete coverage of receipts. About 68 percent of the receipts were topped carrots which compares with about 2 percent in 1939. Wholesale values averaged 12 percent above 1953 on bunched and 16 percent above on topped. Prepackaged film pack topped carrots are becoming popular.

Receipts at *San Francisco* totaled 636 cars, 8 percent less than 1953 and the lightest since 1936. Bunched carrots accounted for 60 percent of the arrivals. From January through May most of the bunched carrots came from Imperial Valley and June through December from the Salinas district. Topped carrots came from many districts in the State, with the Salinas district originating about one-third of the volume, the San Joaquin Valley and Los Angeles area 15 percent each, and the Imperial Valley, Coachella Valley, and the Bay Area about 10 percent each. Wholesale prices were higher the first seven months than in the same period of 1953, but during the remaining five months ranged the same to slightly lower.

Tomatoes: Growers of market tomatoes averaged \$2.21 per lug, 4 percent below 1953. The early spring crop from Imperial and Riverside Counties brought prices above last year while the early summer and fall crops in the rest of the State averaged slightly above to considerably below last year. Total market production was 16,073,000 lugs, 5 percent above 1953 and the largest of record. Summer and fall tomatoes ran heavily to small sizes. Preliminary rail shipments totaled 7,805 cars,

586 over 1953; outbound truck shipments 7,737 cars, 1,234 above; and combined Los Angeles, San Francisco, and Oakland truck receipts of 11,377 carloads of California tomatoes, 497 above 1953. Two layer flats of tomatoes accounted for 89 percent of the truck receipts at the three terminal markets, an increase of 3 percent over last year. Demand for tomatoes in bulk for repackaging at other points continued to increase.

**TOMATOES—GREEN, WRAPPED—WEEKLY AVERAGE F.O.B. PRICES IN CALIFORNIA
SHIPPING DISTRICTS—1954 AND COMPARABLE WEEK 1953**

(Dollars per Lug, 6 x 6 and Larger)

Week ending	Merced-Fresno		Goleta-Oxnard		Northern San Joaquin	
	1954	1953	1954	1953	1954	1953
June 26.....	\$3.25	\$6.83	-----	-----	-----	-----
July 3.....	2.71	6.19	-----	-----	-----	-----
July 10.....	3.09	3.60	-----	-----	-----	-----
July 17.....	3.50	3.25	-----	-----	-----	-----
July 24.....	3.50	3.20	-----	-----	-----	-----
July 31.....	3.42	2.88	-----	-----	-----	-----
September 18.....	-----	-----	-----	-----	\$2.82	-----
September 25.....	-----	-----	\$2.75	\$2.65	2.78	\$2.78
October 2.....	-----	-----	2.72	2.53	2.66	2.52
October 9.....	-----	-----	2.60	2.38	2.66	2.65
October 16.....	-----	-----	2.75	2.75	2.76	2.65
October 23.....	-----	-----	3.19	2.55	3.30	2.55
October 30.....	-----	-----	3.35	2.65	3.20	2.88
November 6.....	-----	-----	3.15	3.12	2.85	2.52
November 13.....	-----	-----	-----	3.75	3.14	3.84

Rail shipments in the *Central San Joaquin Valley* started June 10, one day earlier than in 1953. Low temperatures early in June retarded maturity somewhat but improved the sizes. Peak shipments occurred in the period late June through late July. Because of the improved varieties and handling procedures, California early summer tomatoes met a better market response from areas east of the Mississippi River even under the competition of homegrown supplies.

An abrupt change in mid-June from cool to warm weather brought on rapid maturity. Shipping point prices opened the season at low levels compared with the unusually high opening 1953 prices. Burdensome supplies early in the season compelled the shippers to curtail loadings in order to balance the supply with the demand.

Shipping point prices for wrapped, green, 85 percent U. S. 1 quality, 6 x 6 and larger opened at \$3.25 per two layer lug. Prices advanced slightly after the 4th of July week-end and ranged \$3.25-3.50 mostly \$3.50 the remainder of the season. Supplies of 6 x 7s and smaller frequently exceeded the demand and prices fluctuated widely. Opening prices of \$3.00-3.15 quickly declined to \$2.25-2.75. At this point shippers curtailed the packing of small sizes largely to an "order only" basis. Prices then strengthened and ranged \$2.50-3.25. The last week of the season in the period of clean-up harvest, prices dropped to \$2.00-2.25.

Unclassified pinks followed an erratic market trend influenced by rather wide fluctuations of supply and demand and lack of uniformity between "shed pack" and "farmer pack" stock. Heavy week-end accumulations of "farmer packs" on coast terminal markets frequently caused abrupt shipping point price declines. Despite the unbalanced market distribution, volume of pinks to out-of-state markets appeared to be increasing. Opening shipping point prices on unclassified pinks in two layer flats, 6 x 6 and larger, ranged \$2.50-3.25. Prices declined almost immediately to \$1.25-2.00. Low prices stimulated demand and the market strengthened gradually reaching \$2.00-3.00 by midseason. Prices in the late season cleanup period declined to \$1.75-2.50. F.o.b. prices on 6 x 7s and smaller were discounted from 25 cents to as much as \$1.00 depending upon quality and ratio of supply to demand. By comparison, f.o.b. prices during 1954 were well below 1953 except during the last two weeks of the season when prices were about equal in both years.

Los Angeles wholesale prices of San Joaquin Valley pinks in two layer flats, 6 x 6/larger, opened the second week of June at \$2.00, ranged \$1.50-2.00 the third week, \$1.75-2.25 the fourth week and closed the month at \$.85-1.25. Prices in July ranged \$1.00-1.50.

San Francisco wholesale prices for two layer flats, 6 x 6/larger, opened at \$1.75-the third week of June, rose to \$2.25-2.75 and closed the month at \$1.00-1.50. Prices in July ranged \$1.25-2.25, mostly \$1.50-2.00.

The *Northern San Joaquin and Southern Sacramento Valleys* season was highlighted by being financially successful for shippers even though rail shipments of 4,958 cars were the largest of record. First rail shipments originated at Brentwood July 8, the earliest of record by two weeks. Shipments were light until the week of September 12, then were moderate to heavy until the middle of November. The last shipments were billed from Carbona November 24. Shipments peaked on October 28 with 126 cars, compared with 143 on October 7, 1953, and 129 cars on October 15, 1952. An unusually cool August slowed maturity, spreading shipments over a longer period. Track holdings were generally below the highs of 1953, indicating good distribution and movement. Sizes ran heavy to 6 x 7s and smaller, grading mostly 85 percent or more U. S. 1s.

A steady demand was maintained since supplies of eastern homegrown tomatoes were limited. Medium and small sizes were in demand for the repack trade. Demand for pinks was noticeably better than in 1953. The tomato trade has found that under proper handling this fruit has had good arrival and acceptance in midwestern and eastern terminals. F.o.b. quotations for lugs of green, wrapped, 6 x 6s and larger, 85 percent or more U. S. 1 started September 15 at \$2.75. The market strengthened slightly for two or three days then weakened to the season's low of \$2.35-2.50 in early October. The market strengthened gradually, reaching the seasonal high of \$3.25-3.50 between October 20 and 22. F.o.b. quotations for 6 x 7s opened at \$2.25, reached \$2.50 a week later then declined to \$2.15-2.25 on October 5. The seasonal high of \$2.50-2.75 was reached between October 20-23 then prices declined to the season low of \$2.00 between October 29-November 2. Prices of 7 x 7s followed the same general pattern but were discounted 25-50 cents below the 6 x 7 price level. Demand for U. S. 2 was unusually active because of the rather high price for U. S. 1 stock.

Demand for bulk tomatoes was fairly good. Because of the several different containers used, most quotations were on a per pound basis. Bulk, 85 percent U. S. 1, 6 x 6 and larger opened on September 15 at 6 cents per pound, reached a low of 5½ cents October 4-5 and strengthened to a high of 7½-8 cents October 22-28. 6 x 7s ranged 4-6 cents, mostly 5-5½ cents.

In the *Goleta-Oxnard-Carpinteria District* growers experienced a fairly profitable season. The crop in Chula Vista and Oceanside sold at high prices. There was no frost or rain in Southern California until after harvest. Competition from Florida and Texas was later than usual which benefited California. The bulk of the Southern California crop was packed loose in various containers and sold by the pound.

F.o.b. prices the last half of September at Goleta-Oxnard-Carpinteria were mostly \$2.75 for lugs of green, wrapped, 6 x 6/larger; the first half of October \$2.50-2.75; and the last half of October mostly \$3.00-3.35. Loosepack 6 x 6/larger brought 6 cents per pound September 20-30; 5½-6½ cents per pound October 1-15; and 7-10 cents, mostly 8-9 cents per pound to the end of the season. F.o.b. prices in the Chula Vista-Oceanside district ranged 7-12 cents, mostly 10-12 cents per pound in the period October 14 through November 10.

Receipts at *Los Angeles* were 5 percent over 1953. San Diego County supplied 43 percent, local districts 15 percent, Mexico 13 percent, Imperial Valley 11 percent, Coachella Valley 8 percent, and other districts 10 percent. The two layer pack of California tomatoes has practically replaced the three layer pack on the Los Angeles market.

Asparagus: The 1954 *Delta District* asparagus season was featured by a rather short fresh marketing period as a result of cold weather during March, by a good demand from canners and a fair demand from freezers, and by above average prices for both fresh market and processing stock.

Following more or less normal temperatures through most of February and the first several days of March, the fresh marketing season was just getting well under way when a long period of below normal temperatures, beginning March 10, cut heavily into production. Carlot shipments, which had reached nine cars on March 11, dropped to three cars or less daily for the next two weeks. At the end of the month, however, shipments were increasing rapidly and during the period from March 31 through April 18, loadings ranged 30 to 75 cars daily, with the peak of 75 cars on April 6. After April 18, shipments dropped off rapidly because of the start of harvest in New Jersey. Only eight cars were shipped after April 21, the last car being billed on May 8.

ASPARAGUS—MONTHLY AVERAGE WHOLESALE PRICES^a—1954 AND 1953
(Cents per Pound or Dollars per Crate)

Month	San Francisco				Los Angeles			
	Delta District—Large				Standard to Large except as noted			
	Green		White		Local Orange County		Delta District	
	1954	1953	1954	1953	1954	1953 ^c	1954	1953 ^d
February.....	88¢	36¢	—	25¢	—	—	40¢ ^e	36¢ ^e
March.....	24¢	22¢	27¢	20¢	27¢	29¢	24¢	18¢
April.....	\$3.45	\$3.70	17¢	13¢	14¢	17¢	12¢	13¢
May.....	4.53	3.69	16¢	\$4.13	16¢	15¢	14¢	13¢
June.....	4.88	3.97	18¢ ^b	4.19 ^b	17¢	18¢	15¢	16¢
July.....	4.38	3.56	—	—	15¢	21¢	—	—

^a Simple average of Wednesday prices.

^b Jumbo.

^c Large.

^d Irregular to large.

^e Imperial Valley extra fancy.

Carlot shipments from the State totaled 1,163 cars, 196 less than in 1953 and 105 less than in 1952. Interstate truck movement was the equivalent of 239 cars, 63 less than in 1953 and eight less than in 1952 but heavier than in any previous year. Trucks accounted for 17.1 percent of the combined rail-truck interstate movement, compared with 18.2 percent in 1953 and 16.4 percent in 1952.

Carryover of canned asparagus by California canners into the new season was the lightest since 1949. As a consequence, there was a good demand from canners and the resulting pack was a near record. Carryover of frozen asparagus, on the other hand, was the heaviest since 1947. Freezers were not as active as in 1953 and the frozen pack declined about 30 percent.

Fresh market use accounted for 31.9 percent of the total state production, compared with 38.4 percent in 1953 when the marketing season was longer. The average price received by growers during the season was estimated at \$4.10 per crate, 30 cents higher than in 1953 and 15 cents higher than in 1952 but 20 cents less than the record \$4.30 in 1951. Canners and freezers took 68.1 percent of the total production. The average price of \$217 per ton for processing was \$30 above 1953 and was the highest on record except for 1951, when the average was \$242.

Receipts at *Los Angeles* were 7 percent under 1953. Wholesale values averaged 4 percent below 1953. Local standard to large brought 17-40 cents in March and 10-20 cents in April; Delta supplies, 16-30 cents in March and 10-16 cents in April; and Imperial Valley extra fancy, 23-33 cents in October and November.

Receipts at *San Francisco* totaled 237 cars, the second smallest of record. Practically all the receipts came from the Delta area. A combination of good demand from processors and a late start of harvesting accounted for the decline in volume from the previous year. Wholesale prices were consistently slightly higher than 1953.

Other Vegetables: For convenience, information is presented here for several major California vegetables for which local marketing is more important than interstate shipping or for which the Market News Service does not fully report the f.o.b market. The table on page 339 illustrates the level and trend of prices of these vegetables during 1954.

Prices to producers for *cauliflower* averaged slightly above 1953 with reduced acreage for fall harvest a contributing factor. The downward trend in rail shipments the past eight years was stopped and shipments totaled 2,600 cars, 660 above 1953. Processors took 7,881,000 pounds, the smallest since 1950, which partially contributed to increased shipments. Outbound truck shipments totaled 1,344 carloads, 78 above 1953 but truck receipts in Los Angeles, San Francisco, and Oakland declined to 3,191, 313 below 1953.

Growers in the *Santa Maria-Guadalupe* district considered 1954 another poor season. Rail shipments totaled 1,412 cars, 19 percent above the 1953 low. Heaviest movement occurred in February and March when rail shipments for these months totaled 404 and 425 cars respectively. The market became demoralized late in February and early in March because shipments from the Santa Maria-Guadalupe,

**OTHER VEGETABLES—MONTHLY AVERAGE WHOLESALE PRICES
AT LOS ANGELES ^a—1954 AND 1953**

(Dollars per Package)

Month	Cauliflower		Dry Onions		Broccoli ^b		Cabbage		Corn	
	Local-Oxnard		Local-Spanish		Santa Maria		Local-Oxnard		California	
	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953
January.....	\$1.11	\$0.77	\$1.10	----	\$3.63	\$3.50	\$1.50	\$1.03	----	----
February.....	1.00	.82	.96	----	3.94	4.09	1.19	1.09	----	----
March.....	1.04	1.16	----	----	3.10	4.84	1.75	.99	----	----
April.....	1.21	1.58	----	----	2.72	4.62	1.31	.92	----	----
May.....	1.69	1.06	----	\$1.18	3.63	3.31	1.18	1.06	\$2.91	\$3.42
June.....	1.73	1.25	1.24	1.02	4.15	4.03	1.25	1.72	2.06	3.20
July.....	1.00	1.15	1.68	----	4.66	3.60	1.33	1.23	2.01	2.20
August.....	1.91	1.63	1.72	----	4.96	3.43	1.99	2.50	2.36	2.22
September.....	1.41	1.19	1.37	1.01	5.03	3.33	2.38	2.33	2.39	2.01
October.....	1.38	1.00	1.33	.99	4.66	4.13	2.00	2.25	2.16	2.63
November.....	1.19	.78	1.16	1.03	5.56	4.34	2.22	1.53	2.22	2.16
December.....	1.06	.64	1.61	1.01	4.90	3.48	2.03	1.15	2.94	3.17

^a Simple average of Wednesday prices.

^b Ice pack, heads.

Salinas, and San Francisco Bay districts were too heavy for the east to consume. Some shippers stopped loading and some fields were disced. Freezers took only a small tonnage during this period. The market improved slightly with lighter supplies in April and May. Sales ranged \$1.00-1.50 per pony crate f.o.b. shipping point in January; \$1.10-1.50 in February; \$.90-1.50 in March; \$1.15-1.80 in April; and \$1.25-2.00 in May. A light acreage was planted for fall harvest, with 64 cars shipped in November and December. November f.o.b. sales were mostly \$1.90-2.00 under good demand but in December sales dropped to \$1.25-1.35 because of heavy shipments from Texas. Late in December freezers took a heavy tonnage.

Receipts at *Los Angeles* were 8 percent under 1953. Wholesale values averaged 27 percent higher. Local and Oxnard crates 9-12 heads untrimmed ranged from a low of 50 cents in July to a high of \$2.25 in May, June, and August. The mostly range throughout the year was \$.75-1.50.

Receipts at *San Francisco* declined 14 percent from 1953 and were the lightest since 1932. Nearly 88 percent of the total was produced in the Bay area and the remaining 12 percent mostly in other Central Coast counties and the Los Angeles area. Wholesale prices during the first six months ranged from the same to slightly lower but during the last six months they were a little above 1953.

Prices for California *broccoli* again declined and averaged slightly under 1953. The early spring crop brought the lowest prices since 1942. The fall crop brought slightly higher prices but not sufficient to offset the overall average. Rail shipments of 2,189 cars were the heaviest of records back to 1937. Outbound truck shipments of 270 cars were slightly above 1953. Truck receipts at Los Angeles, San Francisco, and Oakland totaled 557 cars of California broccoli, 6 percent under 1953.

Rail shipments of *broccoli* from the *Santa Maria-Guadalupe District* increased for the seventh consecutive year and totaled 1,060 cars, 86 cars over 1953. The increase was due to increased acreage and smaller utilization by freezers. Growers generally lost money on the early production but showed a profit on the late crop.

Demand was generally slow January through May with an exception of a few short intervals in January, February, and in May. Shipping point prices on good quality heads, packed, 28 bunches to the pony crate, ranged from \$2.50-3.25 in January; \$2.40-3.50 in February; \$2.00-2.50 in March and April; and \$2.50-2.75 in May. These prices, especially those of the lower range, represent a loss to the grower. Prices at the higher range were received for only brief periods. In April some fields were disced. Quick freeze processors showed little interest and took only small quantities. Some cars were consigned but poor returns discouraged shippers from loading except on order.

Fall broccoli, starting in September, met with little or no local demand. Most shipments were consigned until the middle of October when demand improved. The losses sustained by growers during the early part of the year resulted in light

plantings for the fall deal. Demand from the middle of October to the end of the year was good and exceeded the supply at times. The f.o.b. market ranged from \$3.25-5.00 the latter part of October; \$4.00-5.00 in November; and \$3.50-4.00 in December rising to \$4.50-5.00 the last week of the year. Quick freeze processors were looking for supplies the latter part of the year but could not compete with the fresh market.

Receipts at *Los Angeles* were 3 percent under 1953. Wholesale values averaged 2 percent higher. Santa Maria iced crates ranged from a low of \$2.50 in April to a high of \$6.50 in November, mostly \$3.00-4.75. Local loose packed brought mostly 3-7 cents per pound.

Receipts at *San Francisco* totaled 110 cars, the lightest since 1936. About 70 percent originated in the Bay area and the remainder mostly in other Central California coastal districts. Wholesale prices January-April were slightly to considerably below 1953 but in the period May-December prices were slightly higher.

Prices received for winter *cabbage* increased slightly over the low prices of 1953 while prices for the early spring crop dropped below the low 1953 level. Late spring cabbage prices averaged slightly below 1953 but still high compared with the winter and spring deals. California rail shipments totaled only 594 cars, the lowest since 1937 with one exception in 1949. Truck receipts of California cabbage at Los Angeles, San Francisco, and Oakland totaled 4,089 cars, 2 percent under 1953.

Receipts at *Los Angeles* were 3 percent under 1953. Receipts were 89 percent white, 9 percent red, and 2 percent Savoy. Wholesale prices on white cabbage averaged 6 percent above 1953. Local white cabbage ranged \$.75-4.00, mostly \$1.00-2.00, and Imperial Valley \$1.75-2.50 in January and February. Red cabbage ranged from a low of \$1.00 in June and July to a high of \$7.50 in November, mostly \$1.50-3.50.

Receipts at *San Francisco* totaled 522 cars, 29 less than 1953 and the lightest since 1948. The Bay area supplies 60 percent, other coastal counties and Southern California 15 percent, and Imperial Valley 25 percent. Wholesale prices varied from a little higher in 1953 to a little lower, averaging slightly lower for the year.

Prices for California *onions*, both the late spring and late summer crop, averaged moderately above the low 1953 prices. Rail shipments of 3,665 cars were 14 percent below 1953. Outbound truck shipments totaled 418 cars or 12 percent above 1953. Los Angeles, San Francisco, and Oakland total receipts of 2,794 carloads from California were 25 percent over 1953 while total receipts of 1,392 carloads from other areas were 15 percent over.

Kern District onions for fresh market are largely a speculative crop. The 1954 season was generally unsatisfactory, although prices averaged slightly higher than in 1953. Supplies locally and in competing areas were more than adequate for the limited demand.

The first car was shipped May 7, with volume building to a peak of 57 cars on June 1. Last cars moved July 5. Shipments from this district totaled 466 rail cars and 120 carlot equivalents by truck.

Demand was good for mediums the first week of the season, but slow thereafter. Demand was light for large onions as offerings of these were heavy throughout the season. Opening f.o.b. prices for 50-pound sacks of Babosas were \$1.35-1.50 for mediums and \$1.00-1.15 for large. As supplies increased prices declined to \$1.10-1.35 for mediums and \$.85-1.10 for large. After June 18 there was very little f.o.b. trading and most cars were consigned or handled on a price arrival or joint account basis.

Receipts at *Los Angeles* were 19 percent above 1953. California supplied 64 percent, Idaho 13 percent, Oregon 11 percent, and other states 12 percent. Storage onions sold at low prices early in 1954 but summer onions sold at rather high prices in 1954. Wholesale values averaged 24 percent below 1953. Idaho Spanish brought mostly \$1.00-1.25 January through March, and \$1.60-1.85 November and December; Imperial Valley Yellow Bermudas \$2.00-2.25 in May; and local yellow varieties mostly \$1.25-1.75 July through December.

Receipts at *San Francisco* totaled 688 cars, 21 percent above 1953. California supplied about 75 percent, Oregon 10 percent, and Texas, Colorado, and Idaho 15 percent. Wholesale prices January-May were much lower than 1953 but during June-December white onions were about the same while yellow and red onions were mostly slightly to considerably higher.

Bunched green onion receipts at San Francisco totaled 332 cars, only two less than the record heavy volume in 1953. The Salinas-Watsonville area produced about 40 percent of the total, the San Joaquin Valley 25 percent, the Bay area 25

percent, and the Los Angeles area and Coachella Valley 10 percent. Wholesale prices January-May were below 1953 levels but during the remainder of the year varied from slightly lower to slightly higher.

Prices for California corn averaged slightly under 1953. Sharply lower returns for the late spring crop more than offset the slightly higher returns for the early summer and fall crops. Rail shipments of 1,718 cars were 69 percent above 1953 and the heaviest of records dating back to 1931. Improved strains with higher yields, and improved handling techniques contributing to better quality has stimulated an out-of-state demand for California green corn in certain periods of the year. Los Angeles, San Francisco, and Oakland truck receipts of 3,485 carloads of California corn were 5 percent below 1953. Wholesale prices at Los Angeles averaged below 1953.

The *Kern District* summer corn market was generally disappointing. Earliest offerings were in competition with heavy supplies from the desert valleys. Hot weather late in June greatly hastened maturity and offerings were burdensome. First Kern District cars were shipped June 6; volume reached its peak June 28 to July 2; and the last car was shipped July 16.

Demand for earliest offerings was very slow. Shipping point prices opened at \$1.90-2.00 per crate, five-dozen size. Supplies were heavy all season and except for the last week the market was listless. The price range for the season was \$1.75-2.00 except that the market strengthened to \$2.50 for the last offerings. Quality was excellent with offerings of U. S. Fancy grade on the market throughout the season. Shipments totaled 339 rail cars and 297 carlot equivalents by truck.

Harvest of the Kern district fall crop started September 27 and continued until December 6. Demand was moderate through October and prices ranged \$2.25-2.50. In early November offerings from Coachella Valley and Florida were available. Prices declined with increased supplies and ranged \$1.85-2.10 the remainder of the season. Shipments totaled 373 rail cars and 532 carlot equivalents by truck.

California production is important for a number of *other vegetables* for fresh market use, primarily within the State. Items not previously mentioned for which combined Los Angeles, San Francisco, and Oakland truck receipts of California produce exceeded 1,000 carloads in 1954 included romaine, snap beans, green onions, peppers, radishes, soft squash, sweet potatoes, cucumbers, spinach, and parsley. Except for mixed loads, rail, and outbound truck movement was restricted to a few hundred cars each of the vegetables not previously mentioned in this report.

MELONS

Prices received for California melons generally averaged well below 1953 with sharply lower prices for watermelons and moderately lower prices for cantaloups and Persian melons more than offsetting the slightly higher prices for honeydews. The total volume of all melons sent to out-of-state markets, as measured by rail shipments and outbound truck movement was 27,874 carloads or 8 percent over 1953. Truck receipts of California melons at Los Angeles, San Francisco, and Oakland were 8,196 carloads, up 8 percent from 1953.

California rail shipments of melons increased 2,710 cars and except for 1946 was the heaviest since 1931. Cantaloups and watermelons were noticeably heavier with only Persian melons lighter.

UNITED STATES AND CALIFORNIA RAIL SHIPMENTS OF MELONS—1954 AND 1953

Commodity	1954			1953		
	U. S. cars	Calif. cars	Calif. % of U. S.	U. S. cars	Calif. cars	Calif. % of U. S.
Cantaloups.....	28,651	15,283	53	25,431	13,914	55
Honeydews.....	5,807	4,276	74	5,374	4,014	75
Persians.....	242	239	99	347	343	99
Mixed and miscellaneous.....	1,368	1,228	90	1,340	1,102	82
Watermelons.....	28,448	2,345	8	25,277	1,288	5
Totals.....	64,516	23,371	36	57,769	20,661	36

California outbound truck shipments decreased 10 percent under 1953. Lighter truck shipments of watermelons and cantaloups more than offset the slightly heavier shipments of honeydews and other melons.

CALIFORNIA INTERSTATE TRUCK PASSINGS OF MELONS—1954 AND 1953
(Equivalent Carlots)

Commodity	Outbound		Inbound	
	1954	1953	1954	1953
Cantaloups.....	2,009	2,161	872	886
Honeydews.....	152	105	33	135
Other melons.....	189	160	19	26
Watermelons.....	2,153	2,582	905	872
Totals.....	4,503	5,008	1,829	1,919

Cantaloups: Prices received for California cantaloups averaged moderately below 1953. Both spring and midsummer crops brought lower prices. Imperial Valley growers and shippers experienced an unsuccessful season because of a keen early season competition from Mexico and Texas and the only fair shipping quality of the 1954 crop. San Joaquin Valley growers shipped a new record high amount into interstate channels. Nevertheless shipping prices averaged within 35 cents per crate of the high 1953 prices. Total California rail shipments of 15,283 cars exceeded the 1953 shipments by 1,369 cars and were the largest since 1929.

The level and trend of prices during 1954 are illustrated in the following table:

CANTALOUPS—WEEKLY AVERAGE F.O.B. PRICES IN CALIFORNIA SHIPPING
DISTRICTS—1954 AND COMPARABLE WEEK 1953

(Dollars per Jumbo Crate)

Week ending	Imperial Valley				Central California			
	36s		45s		36s		45s	
	1954	1953	1954	1953	1954	1953	1954	1953
May 22.....	\$8.70	\$9.00	\$8.20	\$8.50	---	---	---	---
May 29.....	5.20	9.00	4.70	8.50	---	---	---	---
June 5.....	5.00	8.50	4.22	7.50	---	---	---	---
June 12.....	4.42	7.50	3.50	6.50	---	---	---	---
June 19.....	4.38	4.40	3.50	3.40	---	---	---	---
June 26.....	---	3.15	---	2.58	---	---	---	---
July 3.....	---	---	---	---	---	---	---	---
July 10.....	---	---	---	---	---	---	---	---
July 17.....	---	---	---	---	\$3.60	---	\$2.80	---
July 24.....	---	---	---	---	2.55	\$5.70	2.00	\$5.20
July 31.....	---	---	---	---	2.65	4.50	2.02	4.00
August 7.....	---	---	---	---	3.10	3.90	2.28	3.10
August 14.....	---	---	---	---	3.60	2.85	2.75	2.25
August 21.....	---	---	---	---	4.70	2.90	3.90	2.40
August 28.....	---	---	---	---	3.80	3.20	3.42	2.50
September 4.....	---	---	---	---	3.48	3.20	3.18	2.70
September 11.....	---	---	---	---	3.56	3.62	3.19	3.12
September 18.....	---	---	---	---	3.30	3.75	2.80	3.15
September 25.....	---	---	---	---	3.15	---	2.65	---

The *Imperial Valley* cantaloup season was generally considered unsuccessful by shippers. Earlier shipping areas such as Mexico and Texas eliminated the high prices received for the first Imperial Valley cantaloups. Trading levels were generally below those of the past several seasons. Demand was largely restricted to best quality offerings. The quality of the crop was disappointing and shipping conditions were very poor at times because of soft melons and weak cavities. Acreage planted to cantaloups totaled about 1,000 below 1953. Yields from fields planted to the 91 seed were very disappointing with quality below normal. A small acreage of later maturing 450 type seed brought premium prices as the melons were considered of superior quality. Weather was near normal.

A light rail movement got under way during the week ending May 21 with keen competition from outside areas. Opening f.o.b. prices ranged \$9.00 per jumbo crate 36s, \$8.50 per jumbo crate 45s and 27s, and \$5.50-6.00 per standard crate 45s.

Prices for Jumbo 36s dropped quickly to \$5.00-5.50 then declined more slowly closing the season at \$4.25-4.50 per jumbo crate 36s. Rail shipments from the district totaled 2,332 cars, 871 under 1953.

Cantaloup growers and shippers in the *San Joaquin Valley's*—"Westside" deal established new records in 1954. Harvesting began two weeks earlier than in 1953. Harvesting increased extremely rapidly as substantial early-planted acreages in all sections comprising the district reached maturity simultaneously. Rail loadings totaled 1,166 cars in the week ending July 16, the first week of active harvesting, and 2,873 cars the second week. Peak shipping volume of 511 cars occurred July 19, exceeding the previous record of 367 cars on July 30, 1952, and establishing what may well be an all-time record.

That quality and size ranges were unusually good was reflected in the active demand and generally steady to firm market tone which prevailed throughout the trading season. Oversupply of undesirable size or mediocre quality melons was promptly curtailed through voluntary packing controls by individual growers and shippers.

Acreage harvested in 1954 amounted to 29,000 acres, 4,000 more than in 1953. Yield per acre declined from 170 crates to 165 and average cash returns to growers approximated \$2.85, according to preliminary estimates of the California Crop and Livestock Reporting Service.

Carlot rail shipments of 11,792 cars were the highest of record, exceeding the record 1953 total of 9,514 by 2,278 cars. Outbound truck shipments totaled 1,136 carlot equivalents, a drop of 275 cars from the 1,411 cars recorded in 1953. Truck unloads at Los Angeles, Oakland, and San Francisco increased 250 cars, totaling 1,418 compared with 1,168 carlot equivalents in 1953.

The 1954 marketing season featured several remarkable departures from traditionally expected market reaction. The unprecedented volume of 2,605 rail cars in the first 18 shipping days including a record peak day of 511 cars resulted in only a minimum market recession. In contrast, the comparative period in 1953 recorded sharp market recession with shipment volume almost 50 percent less than in 1954. During periods of excess supply of undesirable sizes or below average quality, shippers voluntarily adjusted picking and packing schedules to meet demand requirements. F.o.b. prices in 1954, in spite of abundant supplies, averaged within 35 cents of the higher 1953 prices. Pre-eminence of the Huron district, as the earliest producing area, has been lost following the experience of the past two seasons wherein Firebaugh-Mendota and Los Banos early plantings have been successfully harvested.

Shipping point prices on jumbo crates 36s opened the season at \$4.50 with 45s and 27s discounted 50 cents per crate. The unprecedented loading volume forced prices down to the season's low of \$2.25 on July 20. An active demand developed and f.o.b. prices advanced 25-50 cents. Except for a momentary decline on July 27, the price trend until mid-August was upward reaching \$5.00. Prices declined in late August to \$3.50, then held firm the balance of season. The Table of "Weekly Average F.o.b. Prices" indicates a seasonal average f.o.b. price of \$3.40 per crate of 36s and \$2.82 on 45s compared with \$3.74 and \$3.16 in 1953.

Receipts at *Los Angeles* were 10 percent over 1953. Wholesale values averaged 1 percent higher. Imperial Valley Jumbo 36s ranged \$4.50-10.00 in May, mostly \$3.00-4.50 in June; Saugus district unlifted Jumbo 36s, mostly \$1.50-2.25 in August and September; and Mendota district 36s, mostly \$3.50-4.50 in August and September.

Receipts at *San Francisco* totaled 639 cars, 48 more than in 1953, and the heaviest since 1951. The San Joaquin Valley supplied nearly 50 percent of the volume, Imperial Valley 25 percent, Arizona 15 percent, and the remaining 10 percent from Blythe, the Sacramento Valley, and Mexico. Wholesale prices were mostly a little under 1953.

Honeydews: Probably the most outstanding feature of the 1954 *Central California* honeydew deal was the steady market tone and the single price quotation for all melon sizes which prevailed with few exceptions during the season. Cool temperatures throughout the season prevented erratic maturing to an extent that supplies were held well within the bounds of daily demand. Shipping quality proved unusually good despite some lack of desirable color. Sizes ran heavily to the preferred 9s and 12s.

Acreage of late summer honeydews totaled 6,600 acres, 200 below 1953. Yield per acre dropped 35 crates from 320 in 1953 to 285 in 1954. Interstate carlot rail shipments totaled 2,133 cars, slightly below the 2,287 cars loaded in 1953. Interstate

HONEYDEWS—WEEKLY AVERAGE F.O.B. PRICES IN CENTRAL CALIFORNIA SHIPPING DISTRICTS—1954 AND COMPARABLE WEEK 1953

(Dollars per Crate)

Week ending	Standard 9-12s		Jumbo 6-8s	
	1954	1953	1954	1953
July 24.....	\$1.90	----	\$1.90	----
July 31.....	1.92	----	1.92	----
August 7.....	1.92	----	1.92	----
August 14.....	1.96	\$2.82	1.95	\$2.34
August 21.....	2.00	2.32	2.00	1.80
August 28.....	2.00	2.22	2.00	1.80
September 4.....	2.25	2.25	2.13	1.75
September 11.....	2.48	2.00	2.33	1.62
September 18.....	2.56	1.69	2.44	1.56
September 25.....	2.25	1.62	2.13	1.62
October 2.....	2.12	1.72	2.17	1.72
October 9.....	----	1.85	----	1.85

motor truck movement showed an increase of 37 carlot equivalents over 1953, and motor truck unloads at Los Angeles, Oakland, and San Francisco increased slightly over the previous season. Increased consumption in the Los Angeles market area more than offset the decrease noted in the Oakland and San Francisco market areas.

F.o.b. prices for the 1954 season averaged \$2.10 per crate for all melon sizes, substantially above the \$1.76 of 1953. Initial offerings brought \$1.85-2.00 per crate for all sizes. This price level held firm until late August when prices advanced to \$2.00-2.25 and again in early September to \$2.25-2.50. A wide range in quality and sizes prevailed during the last period of the season with f.o.b. prices reflecting lower values.

Persian Melons: Prices averaged \$1.73 per flat at shipping point, 12 cents below 1953. Acreage declined 5 percent but yields were good. Rail shipments totaled 239 cars, 30 percent below 1953 and the lowest since 1943. Unloads at Los Angeles, San Francisco, and Oakland totaled 264 carload equivalents, only three more than in 1953. Outbound truck passings were little different than a year ago. First shipments came from Imperial Valley in June but largest shipments came from the San Joaquin Valley and Sacramento Valley in August and September. The season extended into early November. Wholesale prices for Jumbo 6-8s in New York ranged \$3.00-5.50 August-October, mostly around \$4.00. Chicago prices ranged \$3.00-4.50. Wholesale prices in Los Angeles ranged \$4.00-4.50 in June; \$2.00-3.00 in July; \$2.25-3.50 in August; \$2.50-3.25 in September; and \$2.50-3.00 in October. Wholesale prices in San Francisco ranged \$1.75-3.00 in July; \$1.75-2.50 in August; \$2.00-3.00 in September; and \$1.75-2.75 in October.

Watermelons: Prices at shipping point averaged well below 1953 and the lowest since 1949. Cool weather in Pacific Northwestern and Coastal markets during the harvest season was a price depressing influence. Rail shipments were nearly double those of 1953 as a slow demand from truckers forced a greater movement by rail. Price levels and trends are shown in the table on page 345.

Trading levels in the *Imperial Valley* were near or below actual growing costs. Cool weather in the Pacific Northwestern and Coastal markets during the period of early volume movement resulted in a slow demand. Most of the trading in this period was consummated on a price arrival basis and active f.o.b. trading did not develop until the deal was nearly half over. Rail shipments totaling 928 cars were unusually high because of the lack of demand from truckers. This forced many shippers to load rail cars and roll them unsold which had a further depressing effect on the market. Shipping point prices the first week of the season averaged \$45.00 per ton compared with \$63.50 per ton in the opening week of 1953. Prices declined rapidly closing the season in late June at around \$30.00 per ton.

The 1954 summer watermelon deal in the *Central San Joaquin Valley* proved disappointing in many respects. Increased plantings resulted in liberal supplies readily available at all periods during the season. Quality was rather erratic with top grades scarce and supplies of mediocre fruit often burdensome. Demand for best quality was active throughout the season but demand was slow and trading dull in off-grades.

**WATERMELONS—WEEKLY AVERAGE F.O.B. PRICES IN CALIFORNIA SHIPPING
DISTRICTS—1954 AND COMPARABLE WEEK 1953**

(Dollars per Ton)

Week ending	Imperial Valley		Central San Joaquin Valley Points		
	16-19 lbs.		16-18 lbs.	18-20 lbs.	16-18 lbs.
	1954	1953	1954		1953
June 5.....	\$45.00	-----	-----	-----	-----
June 12.....	41.00	\$63.50	-----	-----	-----
June 19.....	32.19	50.00	-----	-----	-----
June 26.....	30.00	56.00	-----	-----	-----
July 3.....	-----	-----	-----	-----	-----
July 10.....	-----	-----	\$20.83	\$25.83	-----
July 17.....	-----	-----	20.00	25.00	-----
July 24.....	-----	-----	20.50	26.25	\$67.25
July 31.....	-----	-----	26.88	34.50	48.00
August 7.....	-----	-----	-----	31.56	40.00
August 14.....	-----	-----	-----	21.88	45.25
August 21.....	-----	-----	-----	20.00	31.00

F.o.b. prices averaged well below the previous season. Melons weighing 18-20 pounds opened the season at \$25.00-30.00 per ton, and ruled steady at \$25.00 through July 23. The market strengthened in late July to reach \$35.00. Liberal offerings mostly of below average quality forced prices down during remainder of the season and f.o.b. prices closed at \$17.50-20.00 per ton. The 14-16 pound size melon generally ranged \$5.00-10.00 below the range of 18-20 pound size.

Receipts at *Los Angeles* totaled 3,316 carloads, 16 percent above 1953. California supplied 81 percent, Arizona 13 percent, and Mexico 6 percent. Wholesale prices averaged 22 percent lower than 1953. Early Mexican melons brought \$160.00-240.00 per ton in March and \$120.00-140.00 in April; Imperial Valley melons \$145.00-150.00 in May, and \$50.00-90.00 in June; Blythe district melons \$40.00-60.00 in June and July; and Los Angeles local district melons \$40.00-60.00 in August and September.

Receipts at *San Francisco* dropped 24 percent from the record 1953. Most of the decrease occurred in receipts from the San Joaquin Valley which dropped 37 percent. Early season receipts from the Imperial Valley also were much lighter than 1953 but heavier volume from the Blythe district just about offset this decline. Limited quantities arrived from Mexico, Arizona, and the Sacramento Valley. Wholesale prices ranged from about the same as in 1953 to slightly lower.

Dried Fruit

Dried fruit markets were mostly strong with raisins the only major exception. Packers actively bought most crops other than raisins at or shortly after harvest. Despite the lightest production of raisins in four years, supplies proved burdensome because of a heavy carryover of reserve and surplus pool tonnages from the 1952 and 1953 crops. Opening trading levels for raisins were moderately above 1953. The outlook for a light 1954 crop was a strengthening influence. Weakness developed at mid-season and prices dropped slightly under dull trading. Dried apricot prices were the highest of record with market strength stemming from the second smallest crop of record. Field prices in important producing areas opened moderately high, then soared to 45 cents per pound. Dried peach prices were steady at moderate levels with the amounts produced slightly above that of the past few years. Prune prices averaged only slightly below the relatively high 1953 level even though the crop was the heaviest in seven years. Featuring the prune season was a price differential between large and small prunes that was even greater than the wide spread of 1953. Though the crop was heavy, it ran to small sizes creating a scarcity of large, carton pack quality prunes. Under an extremely active demand for the light supply of large prunes, prices to growers for large prunes climbed to 13½ cents basis, the highest level of records back to 1929. Demand for small prunes was slow at moderate price levels but all grower crops were quickly purchased by packers to get the large prunes. Dried fig markets were firm and prices moderately above the previous two seasons. Under a fairly good demand, most crops were sold

quickly in September though late sales in November brought higher prices. Dried apple prices averaged slightly below the very high prices of 1953 as an active demand from canners again restricted the dried production. Dried pear prices were the highest of record even though the quantities dried proved heavy. An active demand from canners with early season indications of only a light dried pear output, and a good demand from export markets contributed to the high price.

DRIED APRICOTS

Growers enjoyed a strong, active marketing season with prices averaging 12 per cent above 1953 and the highest of record. A good packer demand, a light carryover, and a light crop contributed to the strong market. Packers entered the field market at one of the earliest dates on record with opening prices equal to or above those of 1953. Growers in all producing districts sold their crops fairly quickly.

A comparison of 1954 crop prices with other recent years is shown in the following table of minimum and maximum prices to growers:

DRIED APRICOTS—PRICES TO GROWERS—UNGRADED, UNPACKED DRIED
APRICOTS IN ORIGINAL CONDITION

(Cents per Pound)

District and variety	1954	1953	1952	1951	1950	1949
Santa Clara Valley						
Blenheim and Moorpark.....	40-45	28-40	36-42	27-36	28-35	24-30
Modesto area						
Blenheim.....	34-37	30-37	30-34	25-28	26-31	21½-25
Tilton.....	34-36	28-35	30-34	25-28	26-31	21½-24½
Riverside County						
Royal.....	38-39½	36-38	35	28-34½	24-28	20-26
Yolo-Solano District						
Royal.....	37-41	35-40	34-35	29-36	28-33	23-28½
Southern San Joaquin Valley						
Blenheim and Royal.....	28-32½	30-34	25-26½	-----	-----	14-16½
Tilton.....	28-32½	30-34	25-26½	-----	-----	14-16½

Trading had started in the San Joaquin Valley by July 1 with prices ranging 28-32½ cents a pound. Trading in Southern California began a week later at 38-39½ cents per pound for Hemet district crops and mostly 35-35½ cents for Ventura County crops. Light trading started in the Modesto district July 8 at 34 cents. The market strengthened during the week and most of the district's tonnage had been sold by July 14 at 36 cents, some best 37 cents. Active trading began in the Yolo-Solano district July 8 when most straight orchard run lots sold at mostly 40 cents a pound. The market was slightly stronger a week later and some brought 41 cents. Trading was light in the Santa Clara Valley to mid-July though packers were actively seeking crops at 40 cents a pound. By July 20, some bids had advanced 5 cents over previous offers and ranged mostly 42-45 cents a pound. Growers sold freely on the advancing market though some packers did not follow the full price advance.

DRIED PEACHES

The 1954 field market opened under a moderate demand for Southern San Joaquin Valley Early Elbertas at prices 1-2½ cents below 1953. When trading started, prices quickly advanced to or slightly above the previous year's level. Average grower returns for the crop equaled that of 1953 though the trade estimated that tonnage dried was considerably larger. Since World War II, average returns have been higher only twice, by a slight margin. Uncertainty prevailed early concerning the utilization of Lovells in the Modesto district and the quantity of peaches to be dried state-wide. Packer demand generally was moderate to good, though it was irregular at the beginning of the season and strong at the close.

A comparison of 1954 crop minimum and maximum prices with other recent years is shown in the table on page 347.

The bulk of the Central San Joaquin Valley Early Elbertas were sold during the last half of July on open price contracts guaranteeing 17 cents. The market was quiet and trading was light then until mid-August when packers commenced actively buying at Winters on 21-cent guarantee contracts. Most of the tonnage there was bought in two days. Most lots at Vacaville and Suisun sold the latter part of

**DRIED PEACHES—PRICES TO GROWERS—UNGRADED, UNPACKED DRIED
PEACHES IN ORIGINAL CONDITION**

(Cents per Pound)

Variety	1954	1953	1952	1951	1950
Freestone					
Muir	17-21	18-21	18-22	16-18	16-23
Elberta	17-21	18-21	15-21	16-18	16-22
Lovell	17-21	18-21	18-22	16-18	16-23

August at 21 cents. In recent years quality of the Yolo-Solano production has been considered the best in the State. Though a large tonnage in the Modesto district had been committed to packers on open price contracts, active trading did not begin until the first week of September when packers offered flat prices ranging 17-19½ cents on regular Elbertas and 19-21 cents on Muirs and Lovells. In the Fresno area most of the regular Elbertas, Muirs, and Lovells sold the last half of August in moderate trading. Prices both flat and on-grade ranged mostly 18-18½ cents for regular Elbertas, 18½-20 cents for Muirs, and 18-20 cents for Lovells.

DRIED FIGS

Prices received by California growers for 1954 crop dried figs averaged moderately above 1953 and 1952 but well below 1951 and 1950. The average price received by growers for standard grades was \$207.00 per ton compared with \$194.00 in 1953. The trading season was brief. Most grower crops were sold in September. Trading was virtually at a standstill in October and November with a slow demand for fig paste and industry concentration on a proposed federal marketing order delaying influences. Trading again became active in early December. The unsold grower crops were quickly purchased at prices about \$10.00 per ton above the September trading level.

Prices of major varieties during the last five years ranged as follows:

**DRIED FIGS—PRICES TO SAN JOAQUIN VALLEY GROWERS—MERCHANTABLE CERTIFICATED
UNGRADED, UNPACKED DRIED FIGS IN ORIGINAL CONDITION**

(Dollars per Ton)

Variety	1954	1953	1952	1951	1950
Black Mission					
Basis 90 percent test	110-130	100-120	80-160	100-140	140-180
Adriatic					
Basis 90 percent test	180-200	180-200	140-160	200-240	320-360
Basis 85 percent test				230	
Calimyrnas					
Basis 90 percent test	260-280	260-270		300-360	400-500
Basis 80 percent test			260-275 ^a	310-330	

^a Basis 80-85 percent test.

Production of dried figs in California totaled 24,200 tons, almost equal to the 24,300 produced in 1953. Compared with earlier years, the dried fig production was light and about 24 percent below the 10-year (1943-52) average. Production of substandard grades totaled approximately 2,000 tons.

Climatically, the season experienced relatively minor disturbances affecting production by comparison with the 1953 and 1952 seasons. Temperatures down to 29 degrees on March 13 caused some damage to first and second leaves on Adriatic orchards in the Chowchilla district and areas south of Merced, and some loss was noted to Profichi Caprifigs. A storm with rainfall in excess of one-half inch in the Figarden and Herndon districts on June 8 destroyed a substantial percentage of the Caprifig bags and reduced activity of pollinating wasps.

DRIED PRUNES

Record high prices for large prunes and moderate prices for small prunes featured the 1954 prune marketing season. The price differential between the various size classes exceeded the comparatively wide spread of 1953. The crop of 184,000 tons was the heaviest since 1950 but sizes proved to be unusually small. Large sizes were

short of trade needs. Furthermore, empty trade channels stimulated an active demand. Prices to growers for large prunes climbed to $13\frac{1}{2}$ cents basis, the highest of records back to 1928. Contrasting this, supplies of small prunes were very liberal and the demand slow but packers readily bought all grower offerings to get the larger sizes along with the small sizes. Prices paid growers for small prunes were well below that for large prunes but higher than in 1953. However, the average price received by growers was slightly below 1953 because sizes averaged smaller than in 1953.

A comparison of 1954 crop prices with other recent years is shown in the following table of minimum and maximum prices to Santa Clara growers.

**FRENCH PRUNES—PRICES TO SANTA CLARA VALLEY GROWERS—UNGRADED,
UNPACKED DRIED PRUNES IN ORIGINAL CONDITION**

(Cents Basis)

Size	1954 ^a	1953	1952	1951 ^a	1950
34/40.....	10-13½	10-12	10-12½	9-9½	10½-12½
41/51.....	10-13½	10-12	10-12½	9	10½-12½
52/61.....	10-13½	9-12	10-12½	9	10½-12½
62/71.....	10-13	8-12	10-12½	9	10½-12½
72/81.....	10-12½	7-12	9-12½	8-9	10½-12½
82/91.....	7-10	6-8½	8-12½	7-8	9½-12½
92/101.....	7-10	6-8½	8-12½	6-8	8½-12½

^a Prices applicable to salable amounts under the terms of the marketing order.

Early season market conditions pointed toward moderate grower prices. Because of light crops the previous two years and near cleanup in trade channels, early season demand was good but at only moderate to low prices. Some packers were soliciting grower crops as early as July at 10 cents basis for large and 7 cents basis for small. Sales at this time were few. Shortly before harvest several important developments changed the market picture. The crop proved much heavier and the sizes considerably smaller than anticipated. Only in the Healdsburg section were the sizes large. Climaxing the preseason market developments was a heavy rain in the Healdsburg section in late August. Preliminary indications were that the bulk of that crop was damaged beyond the point where it could be sold under the quality provisions of the marketing order. Shortly after this rain, all packers quickly entered the field market at higher prices. By mid-September prices for large prunes had advanced to $13\frac{1}{2}$ cents basis. In contrast, demand for small prunes was slow because of the large supply. Packers held their bids at relatively low levels. Nevertheless, packers readily bought all grower offerings to get the large sizes along with the small sizes. The urgency to buy large prunes and the packer reluctance to advance the open market price for small sizes caused unusually heavy "out of line" trading. These out of line deals were mostly flat prices per ton for grower crops whereas normally prunes are bought on a cents basis for each of the various size classes. It is impractical to quote flat prices because of the varying size and quality factor, but, in general, these deals ranged from \$100.00-200.00 per ton depending upon the quality and the assortment of sizes in the individual lot.

Market conditions in each of the various producing districts varied only in the time of sale and the price level. The bulk of the Yuba City-Gridley district and Napa district prunes were sold in early September at mostly 12-12½ cents basis. Trading in the Healdsburg and Santa Rosa sections was active in mid-September. Healdsburg crops were mostly on a flat basis ranging \$150.00-300.00 per ton, mostly around \$250.00 per ton. Santa Rosa district prunes sold mostly on the standard contract at mostly around $13\frac{1}{2}$ cents basis. Santa Clara district prunes were sold the latter half of September at prices ranging from $13\frac{1}{2}$ cents basis for large down to 8-10 cents for smaller basis sizes.

Most contracts throughout the State were limited to the 88 percent salable proportion of each grower crop under the quantity control provisions of the marketing order. Twelve percent of each lot was required to be turned to the surplus pool. The only and major exception was in the Healdsburg section where packers generally assumed responsibility of the pool tonnage and bought 100 percent of each grower's tonnage.

RAISINS

Prices received by growers for the salable proportion of the 1954 crop averaged 14 percent above 1953 and 1952. The value of all varieties was \$176.00 per ton compared with \$155.00 in 1953. However the 177,000 dry tons produced was the lightest in four years and the total value of the crop was the lowest since 1948. Field trading opened slowly with packers cautious. Because of the light crop, approximately 40,000 tons of 1953 reserve pool natural Thompson Seedless were released to free tonnage. Normally this tonnage would have reverted to the surplus pool. The impact of this substantial increase in salable tonnage retarded the effective opening demand. Packer buying activity was slow to moderate in October and November. Most packers confined solicitation to long established grower accounts or to contracts. The usual volume of open contracts was offered and accepted. Occasional drives for limited tonnages were made by individual packers, either to supply immediate requirements or to balance inventory positions. Field trading became active in December with a \$5.00 per ton price drop for natural Thompson Seedless stimulating the demand for that variety. A good demand for Zante currants quickly absorbed the short supply. Demand for Sultanas was erratic and they were generally acquired in conjunction with desirable lots of other varieties. Demand for layer Muscats became active when the extent of the short Muscat crop was recognized. The comparatively short production of Golden Bleached raisins was quickly absorbed.

RAISINS—PRICES TO GROWERS—STANDARD GRADE AND BETTER UNGRADED,
UNPACKED NATURAL RAISINS IN ORIGINAL CONDITION

(Dollars per Ton)

Variety	1954 ^a	1953 ^a	1952 ^a	1951 ^a	1950
Thompson.....	175-180	150-165	150-170	160-175	200-275
Muscat.....	180-210	160-180	150-165	160-180	240-300
Sultana.....	130-170	140-150	140-155	150	230-275
Zante.....	200-210	175-185	150-165	150-160	235-285

^a Prices refer to salable amounts under terms of the marketing order.

Adverse climate contributed to the sharply lower production. Frosts in mid-March coupled with severe frost damage to vine growth the previous season caused a reduction in the numbers of bunches, and heavy burn damage in mid-June resulted in substantial loss. This loss was partly offset by the higher quality and sugar content.

Raisin growers faced the 1954 marketing season with an unusually large carry-in stock of 1953 crop raisins in packers' hands; production potential of 15-25 percent less than preceding crops; an inelastic demand on the domestic market; competitive foreign raisin production slightly below the level of 1953, but of sufficient volume to restrict California exports; and the burden of disposing of carry-over surplus pool stocks of Thompson Seedless, Muscats, and Sultanas from the 1953 and 1952 crops. The marketing order remained in effect with set-aside requirements for Thompson Seedless set at 82 percent free and 18 percent reserve pool, on Golden Bleached at 80 percent free and 20 percent reserve pool, and 100 percent salable on all other varieties.

Field prices to growers on natural Thompson Seedless opened at \$180.00 per free ton but dropped in mid-November to \$175.00. Occasional sales were higher and lower according to quality. A substantial tonnage was purchased at \$160.00-162.00 on 100 percent tonnage basis. The Zante currant field prices opened at \$200.00 per ton and immediately advanced to a strong \$210.00. Muscat layer prices fluctuated between \$200.00 and \$210.00. Loose Muscats advanced from \$180.00-200.00, then dropped to \$190.00. Golden Bleached raisins opened at \$230.00 with a few at \$225.00 and an outstanding sale at \$240.00, holding steady at \$230.00 thereafter. Field prices on Sultanas were erratic opening at \$130.00, developed strength in early November to \$160.00-170.00, declining thereafter to \$130.00-140.00.

The U. S. D. A. again provided a subsidy on exports to specified eligible countries. Export program UMX 95A effective in the 1953-54 marketing season expired October 6. Through September 30, 1954, 49,617 tons of natural Thompsons, 4,145 tons of Golden Bleached, 49 tons of Sultanas, 1,695 tons of Muscats, and 37 tons of Zante currants were exported under this program with a subsidy rate of 2 cents per pound. Program VMX 95A became effective October 13, 1954. This program applied to

unsold 1952 and 1953 crop surplus pool Thompson Seedless, Muscat, and Sultana raisins. Through December 31, exports under VMX 95A totaled 6,301 tons of natural Thompsons, 16 tons of Muscats, and negligible quantities of Sultanas with the subsidy rate of 2 cents per pound. Program VMX 95B became effective December 21 and covered all raisin varieties produced in 1954 with export payment rate of 1½ cents per pound.

Other Processed and Processing Commodities

A very large tonnage of California's fruits and vegetables is processed. Except for dried fruits, however, the Market News Service reports regularly in this field on only wine, grapes for making wine, and strawberries for freezing. Weekly market comments and harvest conditions on deciduous fruits for canning are published when appropriate in a weekly report issued at San Francisco. We also report on honey, market developments for which are included here.

WINERY GRAPE CRUSH

A total of 1,102,959 tons of grapes were crushed by California wineries in 1954, according to the annual industry survey of the Wine Institute. This included 513,269 tons of wine varieties, 215,895 tons of table varieties, and 373,795 tons of raisin varieties. The total was about 95,000 tons above 1953 but almost 100,000 tons below 1952.

About 90,000 tons of the table varieties were Tokays, 42,000 were Emperors, and 40,000 were White Malagas, with the remainder largely Red Malagas and Ribiers. Of the raisin varieties, about 300,000 tons were Thompson Seedless, 62,500 Muscats, and 10,000 Sultanas.

As usual, crushing started in a light way late in July. Most of the early tonnage consisted of packing house culls. A few vineyard-run Palominos, Salvadors, and other wine varieties began to come in just before mid-August but it was not until a month later that volume became heavy. The peak of the wine variety crush occurred during the last half of September and all of October. By the middle of November these varieties had been cleaned up. Vineyard-run Thompsons started about the middle of September and peaked during the last half of the month and the early part of October. Small quantities, mostly vineyard strippings, continued to be delivered until early December. Muscats were spread out from mid-September to December, but most of the tonnage was delivered in October. Tokays were heaviest in October and White Malagas and Emperors during October and early November. For all varieties combined, the big volume was from late September through October. The week ending October 9 was the peak with about 155,000 tons crushed although the week preceding and the week following were almost as heavy.

As in 1953, the relatively light crop, the plentiful supply of labor, and the early coloring of Emperors resulted in most of the production being picked by early November. By mid-November, practically all wineries had discontinued crushing for the season except for several in the Southern and Central San Joaquin Valley which remained open through part or all of December to receive the small quantities of strippings still being harvested.

WINERY GRAPES

Prices paid by wineries for grapes for crushing were slightly higher than in 1953. Thompson Seedless, Sultanas, Palominos, Feher Szagos, and White Malagas in the San Joaquin Valley and Black and White wine varieties in the North Coast area brought the greatest increases over the previous year.

In the *Central and Southern San Joaquin Valley*, vineyard-run Thompsons, Sultanas, Palominos, Feher Szagos, and White Malagas opened at \$40.00 per ton, delivered winery, advanced briefly to \$42.50, then declined gradually to \$35.00, and closed firm at \$35.00-37.50. Muscats opened at \$40.00, declined to \$37.50, then returned to \$40.00 as it became apparent that the crop was picking out light, and the last few lots closed strong at \$40.00-45.00. Black Juice varieties were mostly \$35.00, with some Missions and Grenache \$2.50 higher and some Alicantes \$2.50 lower. Emperors opened at \$30.00 and advanced early in November to \$35.00. Packing house culls opened in August at \$25.00, advanced to \$27.50-30.00 early in September, then returned to \$25.00 early in October. This was followed by a strengthening to \$27.50 about the middle of October, to \$30.00 near the end of the month, and to \$35.00 as the packing season ended early in November. Sugar content in the area was generally satisfactory and in some instances was well above average. Only a rather small part of the tonnage during the season was bought on a basis requiring specified minimum sugar content.

In the *Modesto* area, sugar content was variable and in some cases was relatively low. As a consequence, much of the tonnage was purchased on a sugar basis, with penalties for deliveries below the specified minimum. Thompsons opened at \$40.00 but the price soon went down to \$37.50 and then to \$35.00. Yields were heavy in this area. Black Juice varieties opened at \$35.00 and declined briefly to \$32.50 about the middle of October but soon returned to \$35.00. Alicantes were discounted \$2.50-5.00 throughout the season.

In the *Lodi* district, Black Juice varieties opened at \$35.00 and declined to \$32.50 near the middle of October and held at this level the rest of the season. Alicantes were generally \$30.00 throughout the entire season. Tokays were mostly \$30.00 except for some at \$32.50 at the beginning and end of the season. Packing house culls of Tokays were mostly \$22.50 until the latter part of September, when they advanced to \$25.00.

In the *Napa-Sonoma-Mendocino County* area, common Black wine varieties brought \$40.00-55.00 per ton, with most of the tonnage in the upper half of the range. Common Whites were \$40.00-45.00. Special varieties brought \$70.00-120.00 per ton. The good demand for these North Coast grapes at somewhat higher prices than in 1953 appeared to be the result of an improved movement and reduced inventories of table wines. Santa Clara Valley Black and White varieties were in only fair demand at \$35.00-45.00.

In *Southern California*, prices were only slightly higher than in 1953. Blacks opened at mostly \$35.00-40.00 except for Zinfandels which were \$45.00-50.00, but prices gradually declined to \$30.00-32.50 by mid-October. Whites opened at \$33.00-38.50 and then declined to \$30.00-35.00.

BULK WINE

The market for bulk wines was unusually stable during the year. The level of 50 cents per gallon to the bottling trade for dessert wines, which became established in October of 1953, continued until early July when it began to be apparent that the grape crop would be rather small. At that time, several wineries announced a price increase to 55 cents. By late August, most sales were being made at this price but it was not until late October that it became general. The market held steady to firm through the remainder of the year.

Bulk table wine prices to bottlers showed only very minor variations during the year. At the end of December, North Coast red table wines were 40-45 cents per gallon, blends of North Coast and Valley reds were 37½-40 cents, white table wines were mostly 42½-45 cents, and sweet table wines were 45 cents. These prices have held almost unchanged for more than two years.

HONEY

Prices received by California beekeepers for 1954 crop honey were very similar to those of 1953. The two crops averaged a little above 1948-1952 but were below wartime and immediate postwar levels. Prices were fairly stable during the season and were mostly above support. Supplies were moderate nationally with production totaling 217,414,000 pounds, but were rather heavy in California where the production of 33,831,000 pounds of honey was 43 percent above the light crop of 1953 but 31 percent below record 1952. The increased production in California resulted from an increased flow per colony.

The following table of prices quoted in honey Market News reports shows how prices for the 1954 crop in California compared with previous years:

HONEY AND BEESWAX—PRICES TO CALIFORNIA BEEKEEPERS

(Cents per Pound)

	1954-55*	1953-54	1952-53	1951-52	1950-51
Water white.....	12½-13¼	-----	12½	-----	-----
Extra white to water white.....	12 -13¼	-----	11 -12	-----	10½-11
Extra white.....	12 -14	11 -16	11 -12¾	11 -12	10½-11½
White to extra white.....	11 -13¼	-----	11 -12	11 -11½	10 -11½
White.....	10¼-12¾	10½-15	10½-12	10.1 -11½	9½-11
Extra light amber to white.....	10½-12	10½-12	10½-11	10.1 -10½	9 -10
Extra light amber.....	10 -11½	10 -11¾	10 -11½	10 -11	8½-10
Light amber to extra light amber.....	10½-11½	10½-12	10 -11	10.1 -11	9 -10
Light amber.....	8 -11¾	9 -11¾	9 -11½	9 -11	7 -10
All colors.....	9 -13	9 -15	9 -12	9 -11½	7½-11
Beeswax.....	38 -47	37 -44	35 -42	40 -52	34 -52

* Through February 28, 1955.

The market was unsettled early in the 1954-55 marketing season partially because handlers were awaiting a decision on the export subsidy program. Demand for domestic usage was generally good and demand for export improved after the effective date of the subsidized export program. Supplies of white table grades of honey became light early in the fall, but prices did not advance materially. Supplies of all grades became light as the season progressed. By mid-December producers had only 12 percent of the California production on hand for sale, the lowest since 1945-46. Nationally, producers held 19 percent of the production.

The 1954 crop was again supported nationally at 70 percent of parity through farm storage loans and purchase agreements with the CCC. Up to December 15, 1954, a total of 1,395,000 pounds of honey had been placed under loan nationally, of which 1,120,000 pounds were still under loan. Another 706,000 pounds had been placed under purchase agreements. Loans had been made, but repaid, on 106,000 pounds in California.

The export subsidy program in effect between July 21 and August 30, 1954, provided for governmental payment of $2\frac{1}{2}$ cents per pound to exporters on honey moved to specified countries. Exporters took advantage of this program actively. As of January 8, 1955, 28,709,000 pounds of honey had been approved for export subsidy payment and 718,000 pounds approved for domestic diversion. Large amounts of California honey were exported though available data do not show states of origin.

The beeswax market strengthened gradually as demand continued good. Prices at Los Angeles ranged 38-42 cents June-August and mostly 47 cents per pound thereafter.

BUREAU OF MILK CONTROL

D. A. WEINLAND, Chief

The functions of the Bureau of Milk Control relate to the provisions of Chapter 14, Division 4, and Chapters 15, 16 and 17, Division 6 of the Agricultural Code of California. These provisions involve the establishment and enforcement of minimum prices for fluid milk and fluid cream at both the producer and resale levels. They also include the enforcement of the laws relating to unfair trade practices in the marketing of dairy products in California. In addition this bureau has responsibilities in connection with two separate laws dealing severally with produce exchanges and with the California Dairy Industry Advisory Board.

FLUID MILK PRODUCTION AND PRICES

During 1954 the dairy industry of California experienced stable prices for fluid milk, above-normal differentials between the prices of Class 1 fluid milk and the prices paid to producers for manufacturing milk, a favorable feed-price situation and increased production of both market, or Grade A, and manufacturing milk. For the year as a whole, the estimated production of all milk in California during 1954 was over 6 percent greater than during 1953. The portion reported as market milk production increased approximately 4 percent, while that reported as manufacturing milk showed an increase of nearly 12 percent. An unknown quantity of the milk reported as manufacturing consisted, in reality, of market milk diverted directly to manufacturing milk plants, because of the surplus-supply situation, and reported by the plants as receipts of manufacturing milk.

Since the utilization of market milk in Class 1 fluid milk products was less than 2 percent greater in 1954 than in 1953, the increase of more than 4 percent in production resulted in a significant increase in so-called surplus supplies (production in excess of Class 1 requirements) between 1953 and 1954. The following tabulations show the relation of production to utilization for market milk and the market milk-fat constituent in California during each of the past six years:

MARKET MILK

	<i>Production (thousand gallons)</i>	<i>Class 1 usage (thousand gallons)</i>	<i>Other than (thousand gallons)</i>	<i>Class 1 usage (percent of production)</i>
1949-----	419,659	340,047	79,612	19.0
1950-----	430,905	363,397	67,508	15.7
1951-----	452,576	388,154	64,422	14.2
1952-----	468,758	413,117	55,641	11.9
1953-----	511,224	427,950	83,274	16.3
1954-----	532,597	438,140	94,457	17.7

MARKET MILK FAT

	<i>Production (thousand pounds)</i>	<i>Class 1 usage (thousand pounds)</i>	<i>Other than (thousand pounds)</i>	<i>Class 1 usage (percent of production)</i>
1949-----	139,485	124,913	14,572	10.4
1950-----	142,842	128,640	14,202	9.9
1951-----	149,547	134,881	14,666	9.8
1952-----	153,077	141,868	11,209	7.3
1953-----	164,871	145,893	18,978	11.5
1954-----	171,621	148,494	23,127	13.5

Factors of importance in connection with the production of market milk in California include the differentials between the established prices to producers for market milk used for Class 1 fluid milk products, purposes and the prices paid to producers for manufacturing milk. The differentials between the prices which producers receive for market milk and the costs of dairy feeds are most important.

Changes in the former differentials reflect the relative profit incentives of market and manufacturing milk production; changes in the latter indicate, in some measure, the degree to which producers are induced to expand or to contract their dairy operations. During the past six years, the differentials between market milk prices (Class 1 usage) at San Francisco and at Los Angeles and manufacturing milk prices at San Joaquin Valley plants, expressed in terms of dollars per hundred-weight of milk containing 3.8 percent milk fat, have been as follows:

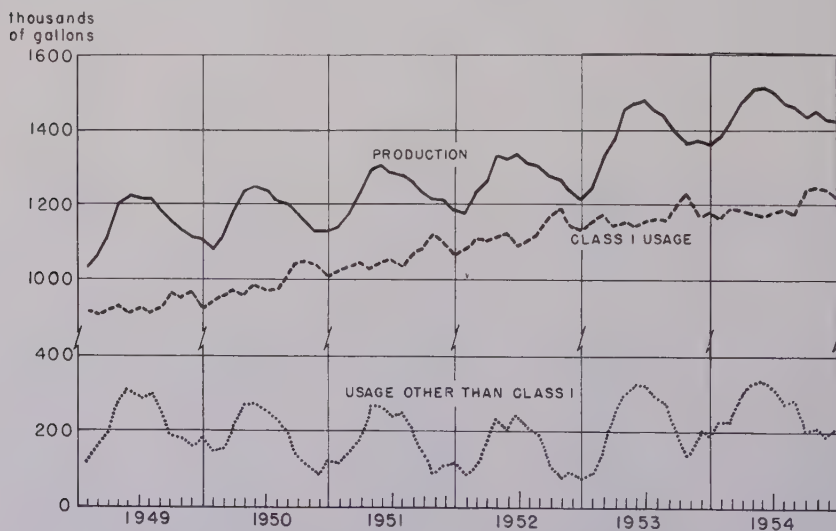
	<i>San Francisco</i>	<i>Los Angeles</i>
1949	\$1.674	\$1.862
1950	1.319	1.482
1951	1.146	1.366
1952	1.308	1.608
1953	1.588	1.899
1954	1.685	1.916

Similar differentials between the Class 1 fluid milk prices at San Francisco and at Los Angeles and the costs of typical dairy rations in the respective areas, expressed in the equivalent of dollars per hundredweight of 3.8 percent milk, were:

	<i>San Francisco</i>	<i>Los Angeles</i>
1949	\$2.331	\$2.405
1950	2.333	2.195
1951	2.239	2.022
1952	2.275	2.182
1953	2.777	2.896
1954	2.602	2.449

PUBLIC HEARINGS

Hearings were held, December, 1953, to establish fluid milk prices, both producer and resale. These newly established prices became effective in most marketing areas of the State during January, 1954; however, there were a few exceptions—price



AVERAGE DAILY PRODUCTION AND USAGE OF MARKET MILK IN CALIFORNIA, BY MONTHS, 1949-1954

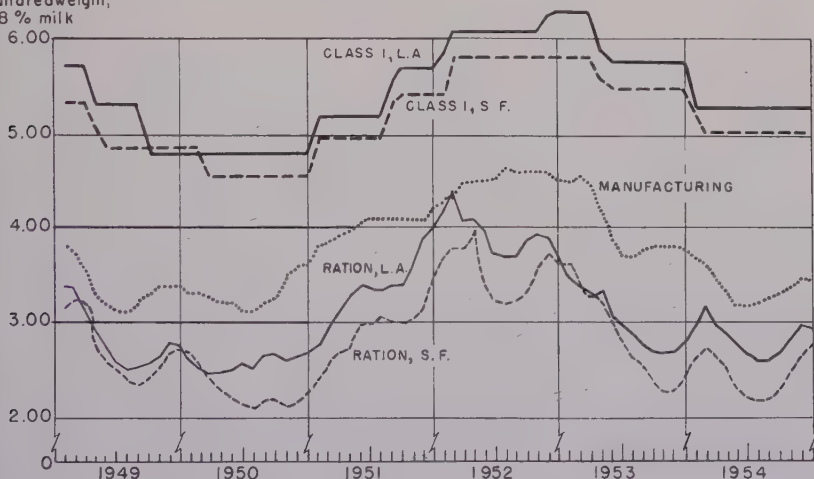
During the past six years, both the production and Class 1 usage of market milk in California have increased. Some leveling off of Class 1 usage, coupled with a significant increase in production, resulted in the development of "surplus" problems in 1953 and 1954. Greater seasonal variations in the production of market milk than in Class 1 utilization have been responsible for "normal" seasonal fluctuations in production in excess of Class 1 requirements.

hearings, both producer and resale, were held for the Del Norte-Humboldt Marketing Area in March, 1954; producer and resale price hearings for the Lassen-Plumas-Sierra, Modoc County and Siskiyou County Marketing Areas were held in April, 1954; a resale price hearing for the Kings County Marketing Area was held in May, 1954. The March, 1954, hearings for the Del Norte-Humboldt Marketing Area were held to amend the producer-pricing formula effective in that area and to make some adjustments in margins for distribution. Hearings held in April, 1954, for the three northern mountain areas resulted in bringing the prices in those areas into line with the prices which became effective in other parts of the State during January, 1954. The resale price hearing for the Kings County Marketing Area was held to consider amendments to the minimum wholesale and retail price order for fluid milk effective in that area. The amended price order was made effective June 1.

Several other price hearings, which resulted in no changes for fluid milk prices, were held by the bureau in California during 1954. One hearing concerned San Mateo County Marketing Area resale prices; the incorporation, in the minimum wholesale and retail price order for fluid milk effective in that area, of a provision for a retail price f.o.b. the distributor's processing plant was considered. Testimony presented at this hearing indicated that a provision of this type was not warranted. A resale price hearing to consider a proposed service-charge-pricing program for the Fresno Marketing Area was held by the bureau during September and October, 1954. Court action was initiated to restrain the order proposed.

During December seven consolidated producer price hearings were held to consider amendments to the stabilization and marketing plans effective in 35 of the 37 California marketing areas. Consideration was given to amending the effective plans to establish minimum prices to be paid to producers for fluid milk which is separated into cream and skim milk in one marketing area, when the cream derived therefrom is shipped to and utilized in another marketing area. Problems brought out during the course of the hearings resulted in the determination that present effective stabilization and marketing plans should not be amended until a program for separate prices for milk fat and skim milk components of fluid milk could be developed.

dollars per
hundredweight,
3.8 % milk



CLASS 1 FLUID MILK PRICES (SAN FRANCISCO AND LOS ANGELES MARKETING AREAS), MANUFACTURING MILK PRICES (SAN JOAQUIN VALLEY PLANTS), AND COSTS OF BASIC DAIRY RATIONS (SAN FRANCISCO AND LOS ANGELES), BY MONTHS, 1949-1954

The general pattern of changes in fluid milk prices, manufacturing milk prices, and costs of dairy feeds in California during the past six years has been similar. However, the timing and degree of changes in the various series have varied somewhat. Due primarily to controls, Class 1 fluid milk prices have experienced more stability than either the prices of manufacturing milk or the costs of dairy feeds.

During 1954 the Lassen-Plumas-Sierra, Modoc County, Siskiyou County and Trinity County Marketing Areas were modified. Their boundaries were redrawn to conform more adequately with uniform production and distribution conditions.

The sales-stimulation and consumer-educational program for the Alameda-Contra Costa Marketing Area was continued for a three-year period, from February 1, 1954, through January 31, 1957. The rate of assessment for support of this program was increased from \$0.002 to \$0.005 per pound of milk fat.

RECOVERIES

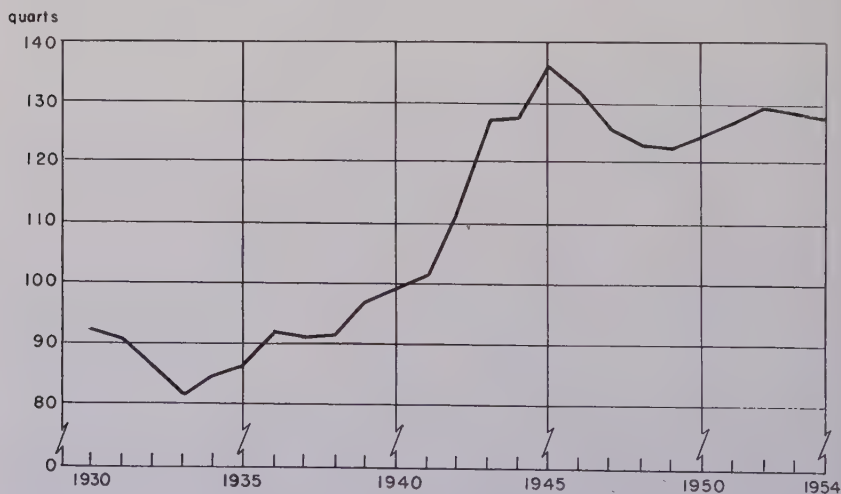
Auditing by the bureau of payments to producers by distributors for fluid milk resulted in recovery of approximately \$208,817 for producers during 1954.

COST OF PRODUCTION—FLUID AND MANUFACTURING MILK

Quarterly surveys of the costs of producing both market, or Grade A, milk and manufacturing milk were made during the year. These cost data were secured from 290 market, or Grade A, milk producers and from 49 manufacturing milk producers. Cost studies of fluid milk distribution were conducted for 66 processing plants.

INTERPRETATION OF STANDARDS

During the year several meetings were held with producer groups, and more particularly with an advisory committee appointed by the Director of Agriculture, for the purpose of discussing the bureau's interpretations of various standards in the Milk Control Act. This subject was also considered by the State Board of Agriculture. It should be noted that in answer to a request for opinion from the Attorney General, with reference to this particular question, the Attorney General ruled as follows: "Milk for fluid consumption is to be priced competitively with milk used for manufacturing purposes. Competition is not, however, to be allowed to create unreasonable instability of prices. On the other hand, prices are not to be more than is necessary to maintain adequate production. The weight that is to be given, at any particular time, to any particular factor influencing price is a matter within the discretion of the expert administrative agency charged with the administration of the law."



PER CAPITA SALES OF FLUID MILK IN CALIFORNIA, BY YEARS, 1930-1954

The general trend in the sales per capita of fluid milk in California during the past 25 years has been upward at the rate of approximately two quarts per person per year. Variations from this trend have been associated with such factors as fluctuations in economic conditions and military activity.

LITIGATION

During 1953 Safeway Stores filed actions to enjoin the director and the bureau from enforcing minimum wholesale and minimum retail prices for fluid milk, which were made effective for the Kings County Marketing Area on June 8, 1953. The Superior Court of Kings County issued a temporary restraining order pending the trial of the case and set the matter for trial in June, 1954. In January, 1954, a motion of Safeway Stores to include several other marketing areas in the Kings County case was denied by the superior court. In June, 1954, arguments were heard in the district court of appeal on a writ of prohibition against the superior court's order of inspection of working papers and records of the Bureau of Milk Control in this case. The district court of appeal denied the writ and was sustained by the State Supreme Court. The trial of the Kings County case, which began on June 1, was not concluded during 1954. An application of Safeway Stores for a preliminary injunction to restrain the enforcement of the June 1 resale price order for the Kings County Marketing Area was denied.

On November 26 the San Francisco Superior Court issued an order restraining the effectiveness and operation of the amended minimum wholesale and minimum retail price order for the Fresno Marketing Area, which order was to have become effective November 28. This court order was issued on request of the California Retail Grocers Association and of two grocers in the Fresno Marketing Area. The court further ordered the prices effective prior to November 28 to remain in effect. In December six independent distributors operating in the Fresno Marketing Area joined in a request for an injunction. No further action on this case occurred during 1954.

The bureau filed seven court actions during the year, of which three are still pending. Collections in civil penalties amounted to \$3,100. Court actions filed against the bureau during 1954, in addition to those referred to above, included 11 filed by Safeway Stores which contested the validity of minimum wholesale and minimum retail price orders in 25 marketing areas, exclusive of Kings County, and also challenged constitutionality of the resale pricing provisions of the Milk Control Act. All of these cases were still pending at the end of the year.

During 1954 the bureau took action on the licenses of three fluid milk distributors, in accordance with provisions of the Administrative Procedure Act. Following the filing of accusations or statements of issues in connection with these licenses, one license was revoked, another was surrendered and the third was suspended for 90 days, with execution of the suspension being stayed under probationary conditions.

DAIRY INDUSTRY ADVISORY BOARD

During November, 1954, the bureau held nomination meetings throughout the State to receive nominations for appointments to the California Dairy Industry Advisory Board. After the nominations were received, nine appointments were made, eight to fill vacancies created by expiring terms and one to fill a vacancy due to resignation.

The purposes of the California Dairy Industry Advisory Board are to enable the dairy industry, with the aid of the State, to develop and expand markets for milk and dairy products produced, processed and manufactured within California. The statute requires the State Director of Agriculture to prepare and disseminate accurate and scientific information relative to the healthful qualities of milk and dairy products; their food values; methods, care, and precautions necessary to their proper production, processing, manufacture and distribution; and the benefit derived from consumption of dairy products of the highest standards of quality.

Activities required to be carried on by the statute are financed by an assessment levied upon all producers, distributors and manufacturers of milk and dairy products within California. The board operates on an annual budget of approximately \$400,000.

The board is comprised of 25 members representing all segments of the dairy industry and is appointed by the Director of Agriculture from a list of nominations made by the industry. The work of the board is carried on under the direction of the manager, whose offices are located in Sacramento.

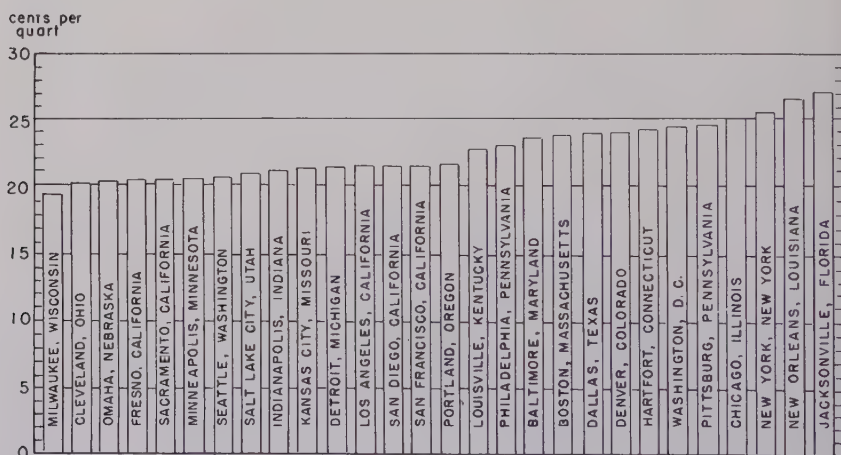
The major activities carried on are divided into four broad classifications: education, publicity, research and advertising. There has been a well-established program in educational activities which carries the story of the dairy industry to a vast and influential consumer audience—school children and their parents. The school ma-

terials of the board are prepared for the California curriculum and fit into the regular course of study. Distribution is made on direct request of school administrators and teachers. During 1954 over three million copies of material were distributed. These include posters, pamphlets, filmstrips, and sound and color films.

The purpose of the publicity program is to impress upon the public mind the understanding that California's dairy industry is a forward-looking, fair, efficient industry which serves the public interest by furnishing adequate quantities of pure and healthful milk and dairy products. The industry's foremost desire is to operate in the best interests of the citizens of the State within sound economic limits. The board initiates programs with food page editors and home economics directors on television and radio, for the purpose of educating milk-consuming families to the better and fuller use of milk and dairy foods in their daily diets. Exhibits and displays are presented at the two principal California fairs. The board provides the leadership and materials for the industry's June Dairy Month promotion.

The research projects carried on by the Dairy Industry Advisory Board are designed primarily to prove that for food value, nutritional quality and flavor, there can be no substitute for dairy foods. Special projects are carried on by the research staffs of the University of California College of Agriculture, Davis; the U. C. Department of Home Economics, Berkeley; and the School of Medicine, University of Southern California.

The advertising program is planned and timed to take full advantage of the seasons and flush production period, together with the natural sales appeal of milk and all dairy products, individually and collectively. The 1954 advertising program carried full radio spot coverage throughout the State on an annual basis. In addition, the board, in cooperation with the American Dairy Association, secured the airing in California of three outstanding programs.



SOURCE OF DATA FOR CITIES IN STATES OTHER THAN CALIFORNIA: UNITED STATES DEPARTMENT OF AGRICULTURE, AGRICULTURAL MARKETING SERVICE, FLUID MILK AND CREAM REPORT, MONTHLY ISSUES.

PREVAILING RETAIL PRICES OF FLUID MILK DELIVERED TO HOMES, 5 CALIFORNIA CITIES AND 23 MAJOR CITIES IN STATES OTHER THAN CALIFORNIA, 1954

The laws relating to milk control in California provide, among other considerations, for establishment of consumer prices for fluid milk which are reasonable. A comparison of the retail home delivered prices of fluid milk in California markets during 1954 with similar data for major cities in other parts of the United States indicates a relatively favorable situation for consumers in this State.

BUREAU OF AGRICULTURAL STATISTICS

GEORGE A. SCOTT, *Chief*

The Bureau of Agricultural Statistics, commonly known as the California Crop and Livestock Reporting Service, is a service agency, and has no regulatory functions. It operates under a cooperative agreement between the California and United States Departments of Agriculture and is jointly supported by both departments. It thus functions simultaneously as a bureau of the State Department of Agriculture, and as a field unit of the Agricultural Estimates Division, Agricultural Marketing Service of the United States Department of Agriculture. In the latter capacity it provides the basic records and estimates of California agriculture as part of corresponding national data. These, along with similar data for other states, form the basis for systematic and continuing statistical records and current service reports for both California and for the United States.

Through such cooperative arrangement, duplication is avoided in rendering necessary public service in the field, and more extensive statistical coverage of the State's agriculture can be made; it permits ready use of much statistical information developed as by-products of normal activities of other bureaus of the department; and the bureau is in a position to render more effective service to the department and to other state agencies.

Briefly outlined, the principal function of this bureau is to develop, prepare and publish estimates of the acreage, production, average prices and values of all major crops and corresponding estimates of livestock and poultry in California. In general forecasts of production are made during the growing season for all principal crops, followed later by estimates of their production and value. Numbers of livestock and poultry are estimated annually, as are items of production and value of the principal livestock and livestock product items. In addition, monthly estimates are made and published covering production of milk and eggs, and of average prices for many farm products. Weekly estimates are made of chicks and poultts hatched; numbers of cattle in feedlots are published quarterly.

In cooperation with county agricultural commissioners, the bureau also maintains records of acreages of all major fruit and nut trees and of grapes. A report showing these acreage data by counties, by principal varieties and by age groups is published each year. The field surveys required to obtain these records have been more comprehensive in recent years through additional state and federal funds made available under the provisions of the Research and Marketing Act of 1946.

The bureau carried on its usual services and reports during 1954 without expansion in staff or significant changes in the character of its functions. The volume of requests for information and for special services continues high. Weekly surveys and reports covering the hatchings of turkey poultts, segregated between heavy and light breeds, were begun in the latter months of 1954 in California and in 11 other principal turkey-producing states. This project followed upon urgent requests of turkey producers throughout the country for such reports needed by them in planning their production programs. Weekly reports were continued on the hatchings of chicks, segregated between layer and meat-type chicks and the placements of chicks for feeding out as broilers and fryers. The quarterly surveys and reports of cattle in feedlots were also continued through the year; the annual surveys and reports of raisin production were discontinued because of unavailability of funds.

It is not feasible to include in this report the detailed statistical data contained in the large number of mimeographed and processed reports published by the bureau. Such reports are issued to provide producers and the public in general with current information about prospective and actual farm production, acreage changes, price trends and general conditions affecting agriculture. Appropriate summary reports are published and made available to those who request and need them. Copies of all such reports are available in the bureau. During the year ending June 30, 1954, the bureau published more than 230 separate reports for distribution, including several small statistical bulletins containing a limited volume of comprehensive historical data. It is appropriate here to record that the statistics and related information made available to the public by this bureau are primarily based upon the loyal co-operation of thousands of farmers, stockmen, dealers, processors and warehousemen, who make reports directly to this office, and upon information and reports made

available by many other individuals and firms identified with the State's farming industry. This long-standing voluntary cooperative arrangement between people engaged in various phases of California's agricultural industry and the department is both unique and effective. Most primary information is obtained quickly by mail at low cost. In turn, the estimates and information published by the bureau are free from intentional bias and distortion and are promptly made available to thousands of farmers and to others in the State who want them.

Year-to-year changes among the highly diversified and varied types of farm enterprises in California form an irregular and somewhat mixed pattern, and the records of different segments of the industry do not always clearly disclose underlying major trends. This brief report can touch upon only those recent developments in the State's agriculture which appear most significant. These relate to over-all farm production achievements in 1954, to the principal changes which have occurred and to the economic position of agriculture as indicated by general price and gross value comparisons for recent years.

UPWARD TREND CONTINUES IN ANNUAL CROP PRODUCTION

The combined production of the principal crops grown in California during 1954 was 27,300,000 tons. This marks a new high record in aggregate output of crops in this State. It is 4 percent more than the next highest tonnage grown in 1953, and was 47 percent greater than the average output in the 1937-41 period. Crop tonnage data for each of the main crop groups for recent years are shown in Table I. These figures clearly disclose the expansion that has been recorded in the State's aggregate crop production during recent years. Not reflected in the figures is the marked increase in the acreage of irrigated pastures, which has grown from about 235,000 acres in 1940 to approximately 800,000 acres, and now ranks as one of the State's important "crops."

TABLE I
COMBINED PRODUCTION OF CROPS IN CALIFORNIA
(Excluding certain minor crops and others indicated)
(Thousand Tons)

	Fruit and nut crops ^a	Vegetable crops ^b	Field crops	Totals
Average 1937-41.....	6,267	2,397	10,047	18,571
Average 1942-46.....	7,073	3,400	10,998	21,471
1947.....	7,556	4,066	13,009	24,631
1948.....	7,001	3,676	12,809	23,486
1949.....	6,314	3,780	12,812	22,906
1950.....	6,369	3,956	15,137	25,462
1951.....	7,644	5,262	12,703	25,609
1952.....	6,931	5,057	13,949	25,937
1953.....	6,703	4,842	14,770	26,315
1954 ^c	6,268	4,776	16,256	27,300

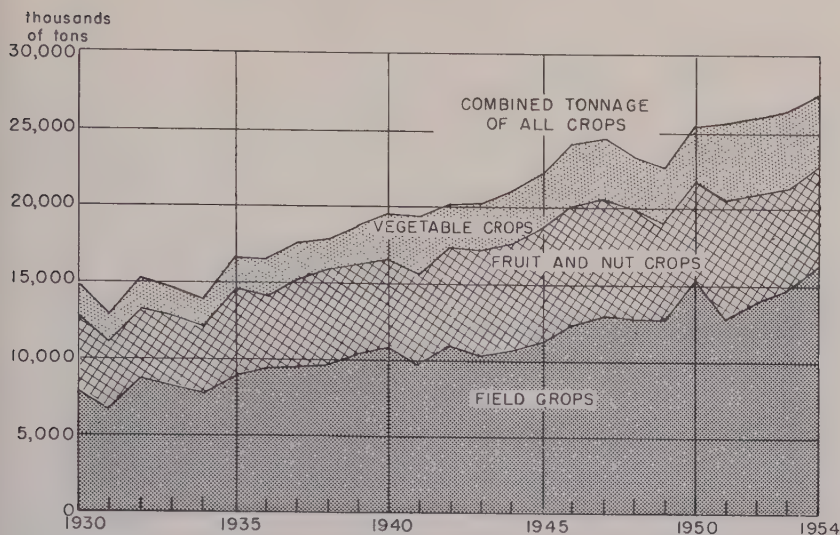
^a Excludes dates, nectarines and minor fruits.

^b Excludes potatoes, which are included in "field crops."

^c Preliminary for 1954.

Crop tonnages produce during the past 25 years are depicted graphically in Chart I. From this it is seen that the combined tonnage of field crops comprises an increased proportion of all crops in recent years and has roughly doubled since the early 1930's. The combined production of fruit and nut crops increased substantially after 1934, maintained high levels during 1945, 1946, 1947, and 1951, but recorded somewhat smaller crops in other recent years. The over-all output of vegetable crops has increased approximately 170 percent since the early 1930's and has become fairly stable at a record high level during the past four years.

The remarkable increase in the State's total output of crops during the past 25 years has been brought about by a number of factors. A great deal more land has been brought under irrigation and crop production in this period, and the combined acreage of crops grown has steadily expanded; in 1954 it was the largest in the State's history. This expansion is graphically shown in Chart II. In addition other factors have contributed heavily to the increase, among which may be mentioned the rapid mechanization of farming operations; greatly increased use of fertilizers; improvements in farm practices and in the control of insects, plant disease and



Combined production of crops in California, by major crop groups, 1930-1954.

weeds; and in the development and extensive use of crop varieties better adapted to local conditions.

Chart II simply traces the trends of the total acreages of land used for crops or otherwise under cultivation in the State for the past 34 years. Precise records on this factor are not available, so that estimates of same have been made for five-year intervals. The total for each year includes the estimated acreages of all principal and minor crops, irrigated pastures and summer fallow, from which is deducted the estimated acres double-cropped. The chart indicates the significant and steady expansion in land farmed in the State, which partially accounts for the big increase in California's farm production during the period. Much of the increase in the acreage farmed during this period resulted from additional land brought under irrigation. The acreage farmed has increased nearly 30 percent since 1920; about 20 percent since 1930 and 10 percent since 1940.

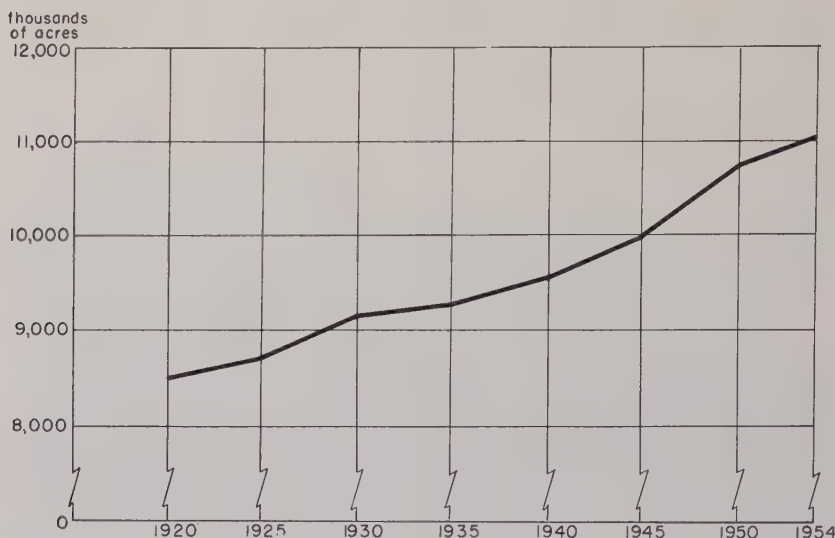
The combined tonnage of field crops grown in 1954 was of record proportions. It was 10 percent higher than in 1953 and 48 percent higher than the average tonnage for the 1942-46 period. Production of this group of crops in 1954 was featured by a record high output of barley and sugar beets, large production of other feed grains, hay, rice, and beans, but smaller crops of wheat and cotton because of acreage restrictions under the national allotment programs.

The combined production of the principal fruit and nut crops in 1954 declined for the third successive year, and was 6 percent lower than in 1953 and 11 percent below the 1942-46 average production. Smaller crops of oranges and grapes accounted for most of the decrease as compared with 1953. Other crops in the group recorded relatively high production in 1954, with very large crops of lemons and Bartlett pears. California produced about 43 percent of the United States' total output of fruit and tree nut crops in 1954.

The State's output of commercial vegetables in 1954 remained comparatively stable but was 41 percent above the 1942-46 average production. About 29 percent of the national production of commercial vegetables was grown in California.

Climatic factors affecting crop production in the State during the 1954 season were predominantly favorable. With relatively few exceptions, crop yields were good, and for several crops very high yields were obtained. Some losses in crops and reduction in yields are sustained each year because of unfavorable weather factors, plant diseases, drouth conditions, etc., but such losses were not excessive in 1954 on an overall basis. However, injuries or losses were comparatively severe in a few crops, principally in local areas.

Records of the quantities of the several livestock and poultry commodities produced are not reducible to a realistic common denominator. Complete data on these



Approximate total acres used for crops in California at five-year intervals, 1920-1954.

factors for 1954 are not available, but information now at hand indicates that the State's farmers and stockmen in 1954 marketed more milk, beef, eggs, and chickens than in any previous year. Feed lot feeding of cattle for slaughter expanded further during the year. Somewhat fewer turkeys were grown, although more were produced here than in any other state. Sheep and wool production is currently stabilized at about 40 percent below the 1942 level; hog raising in California is at the lowest point in more than 85 years.

CROP VALUES AND FARM INCOME CONTINUE AT HIGH LEVELS

The aggregate farm value of the principal crops grown in California in 1954 amounted to \$1,623,010,000. This was about 2 percent more than was registered for 1953 crops, was 8 percent below the record high level reached in 1951 and in 1952 but exceeded the 1942-46 corresponding average value by 32 percent. The value of crops grown in California exceeds that for any other state.

The combined value of fruit and nut crops grown in 1954 was about 4 percent more than that for the 1953 crops, despite smaller production, but was 19 percent below the 1942-46 average value of these crops. The total value of vegetable crops fell off slightly, while that for field crops was up 2 percent from the 1953 figure. Compared with the 1942-46 averages, the value of vegetables was up 51 percent and that for field crops up 95 percent. In terms of value, cotton still ranks by far the most important crop in the State.

Table II shows the combined values for each of the three major crop groups and the grand total of same for each of the most recent eight years, as well as averages of these values for immediately preceding periods. These data provide a useful dollar measure of the year-by-year position and trends of crop production in the State. These crop value figures represent gross farm value of the entire production of crops sold and used on farms; they do not represent net income to farmers nor do they afford a relative measure of net income between years.

Estimates of cash returns to producers from the sales of livestock, wool, milk, eggs, and poultry during 1954 are not available at the time this report is prepared; however, it is apparent that the combined cash returns from these sources in 1954 were moderately lower than they were in 1953. Returns from meat animals held up well in comparison with the preceding year, but those for poultry, eggs, and milk sustained considerable declines. Cash returns from livestock and poultry normally comprise about 37 percent of the State's total calendar year cash receipts from the sale of all farm products.

FARM PRICE INDEX AND PARITY RATIO LOWER

General level of prices received for farm products by farmers declined moderately during 1954, continuing the downward trend in effect during the preceding two years. These price level changes and trends are best shown in the monthly and annual national index numbers of prices received by farmers, which averaged 250 during 1954. This was eight points or about 3 percent lower than corresponding figures for 1953, and 17 percent below the recent high of 302 recorded for 1951. Price declines during 1954 were most pronounced for poultry, eggs, milk, and vegetables, and these accounted for most of the drop in the overall index. Prices for most other principal farm products registered relatively small changes during the year; a few showed substantial gains from 1953 prices. In California prices for fruit crops in general were well sustained and some increased during the past year. Prices for vegetables as a group decreased somewhat during the year, as did those for field crops with the important exceptions of cotton, potatoes and field seeds.

In contrast with the declining price trends for most farm products, farmers' over-all costs of labor, machinery, materials, supplies, services, interest, and taxes increased slightly during 1954, as shown by the national index of these costs as a group. The average index for 1954 was 281, which was only six points or 2 percent below the high mark recorded for 1952. The ratio between this index and that for prices received by farmers noted in the preceding paragraph is known as the parity ratio, which reflects the economic position of farmers as compared with other segments of the national economy. The average parity ratio during 1954 was 89, which was 4 percent lower than that for 1953 and 23 percent below the high point recorded in 1947. Thus, the relative economic position of farmers became still less favorable during the past year and was at the lowest level since 1940. Moreover, the costs of processing, transportation, and distributing farm commodities continues to increase, so that the reduced prices of farm commodities at the farm level are not proportionately reflected in the prices that consumers pay for them. The farmers' share of the consumers' food dollar has steadily declined from 52 percent in 1946 to 43 percent in 1954.

TABLE II
COMBINED FARM VALUE OF PRINCIPAL CROPS IN CALIFORNIA
(Thousand Dollars)

	Fruit and nut crops ^a	Vegetable crops ^b	Field crops	Totals
Average 1937-41.....	181,729	96,889	174,801	453,419
Average 1942-46.....	581,635	239,007	407,553	1,228,195
1947.....	428,808	317,641	664,396	1,410,845
1948.....	418,109	287,727	658,434	1,364,270
1949.....	357,614	289,501	612,080	1,259,195
1950.....	506,790	287,172	683,872	1,477,834
1951.....	503,543	379,508	882,402	1,765,453
1952.....	447,504	375,651	945,334	1,768,489
1953.....	454,478	366,169	765,615	1,586,262
1954 ^c	472,047	360,489	790,474	1,623,010

^a Excludes dates, nectarines and minor fruits.

^b Excludes potatoes, which are included in "field crops."

^c Preliminary for 1954.

RESEARCH AND MARKETING ACT PROJECTS

In addition to performing its usual functions, the bureau in recent years has engaged in certain research and service activities which directly relate to its basic functions. Such activities are principally supported by state and federal funds made available under the provisions of the Federal Research and Marketing Act of 1946, and in part by funds made available by local grower-industry groups. The bureau's work in these special projects principally grew out of requests from certain commodity groups in the State for greater precision in the forecasts and estimates of production, relating particularly to crops involved under state marketing orders. Other phases of similar activities relate to the development and dissemination of basic data on actual and potential crop production and distribution. Thus, these activities were undertaken to enlarge and improve the bureau's basic services and

to explore and test alternative methods for estimating crops, which methods may have application for other crops here or elsewhere. In the research phases of these projects the bureau fortunately has had the active technical assistance of members of the Agricultural Experiment Station and the Giannini Foundation of Agricultural Economics, University of California. The statements in this report merely sketch the type and progress of activities carried on under these projects, without enlarging upon details of operations or results.

The annual surveys of bearing and nonbearing acreages of California's major fruit and tree nut crops are made more complete by use of Research and Marketing Act funds to conduct the necessary extensive field work. The records acquired in these surveys show acreages of these crops in detail by kinds, by varieties, by age groups and by counties. The work is carried out in cooperation with county agricultural commissioners. Under this arrangement and support, systematic and comprehensive records of these acreages are maintained year by year. A bulletin is published annually recording these data. The information is widely used by individuals, groups and agencies identified in producing, processing and marketing these crops.

An annual survey of the acreage of principal types of bush berries grown in the State is made each year, and an appropriate brief report is published for the use of growers, processors and others engaged in marketing these crops.

The bureau is engaged in exploratory work, testing objective sampling techniques as a basis for forecasting and estimating fruit production. During the preceding two years this type of operation has concentrated on Bartlett pears and cling peaches; the work in those years was supported entirely by funds provided by these commodity groups operating under state marketing orders. This activity was continued during 1954 through the use of matching Research and Marketing Act funds. This type of research work involves many problems in obtaining complete and precise statistical observations over wide areas. In addition it is difficult to identify and account for the influence on fruit production of many factors other than the counts and sizes of fruits on trees at various intervals. Thus, progress toward developing standardized procedures and techniques is necessarily slow; however, early season forecasts which have been made during the past two seasons based upon these methods have been highly encouraging. It is believed preliminary stages of the tests can be concluded for these two crops during two more seasons' work.

BUREAU OF FRUIT AND VEGETABLE STANDARDIZATION

H. W. POULSEN, *Chief*

Standardization enforcement work throughout the State includes the direction of 52 county agricultural commissioners and their staffs in the enforcement of specified standards in the Agricultural Code; standards apply to eggs, honey, walnuts and 34 of the important fruits and vegetables produced in California. In addition all other fresh fruits and vegetables not governed by specific standards are inspected for serious decay and insect damage as well as deception in packing and mislabeling.

Administration of seed potato certification and the maintenance of seed potato test plots are also functions of this bureau. These are optional services supported by fees paid by growers. The canning tomato inspection service, another self-supporting function, requires the inspection of all canning tomatoes; this inspection is compulsory and is supported through fees paid equally by grower and canner.

STANDARDIZATION ENFORCEMENT

Fruits, Nuts, Vegetables, Honey, and Eggs

The quality, packing, container and marking requirements of the Agricultural Code applying to fruit, vegetables, honey, eggs and walnuts are intended to maintain and improve the reputation of California products in our own markets as well as throughout the Nation, and to protect the consumer from fraud, mislabeling and deception. The large volume of commodities produced and consumed in California are inspected and regulated in producing areas, wholesale markets and retail stores throughout the State.

County agricultural commissioners, their deputies and inspectors enforce these laws under direction and supervision of this bureau. Inspections throughout the State during 1954 resulted in 11,768 rejections involving 698,087 packages, plus 1,214 tons of various fruits and vegetables. The number of rejections for 1954 is an increase of 11 percent over the previous year.

In the case of grapes, shipments started the latter part of May from Coachella Valley; soon after this, harvesting started in the Borego and Imperial Valleys, then Kern County and later Tulare and Fresno Counties. A large part of the time, as each of these districts started, almost every lot packed was tested for compliance with minimum soluble solids maturity requirements.

The Beaumont Highway Inspection Station, operated by personnel of this bureau, on the highway between Coachella Valley and the large wholesale and retail distributing area in Los Angeles, inspected and tested many truckloads of these grapes. A large number of rejections were made because of immaturity.

County agricultural commissioners in Riverside, San Diego and Kern Counties added additional inspectors to their regular staffs to inspect grapes. As the season progressed, Fresno and Tulare Counties also assigned additional inspectors to grape inspection work.

When Thompson Seedless grapes in the San Joaquin Valley districts were ready, the 18 percent soluble solids minimum, in some cases, was difficult to meet; however, if such lots tested 17 percent soluble solids and also had a ratio of 25 parts soluble solids to one part acid, a provision in the law permitted them to be shipped. This test was used to some extent this year.

Representatives of this bureau participated in the grape testing from Borego and Coachella Valleys to Kern, Tulare and Fresno Counties, to assure uniformity of testing procedures and efficient enforcement.

Low temperatures which occurred in citrus areas during December, 1953, resulted in freezing injury to oranges. Freezing damage to citrus was not a general problem, but careful inspection was maintained throughout the year. As a result of surveys pertaining to the development of frost damage, the director established Date A as February 15 and Date B as March 7; this regulation in effect provided that during the period between these dates, oranges were to be inspected for symptoms of frost damage by two methods (center cut and segment cut) instead of only one of these

methods, as was the case before Date A. After March 7 only the center cut was used. All reports indicated this procedure was successful.

Most lemons and a large percentage of oranges and grapefruit were shipped in the newly established fiberboard, one-half size container.

High temperatures which occurred in the apricot producing areas caused apricots to be affected by a browning condition in the flesh next to the pit, particularly in the late producing area. This defect is not mentioned specifically in the code, but when serious it is considered a defect in the apricot section under the heading "other causes." After a public hearing, the Director of Agriculture issued a regulation which specifically defines this defect; the effect has been to establish needed uniformity.

Commissioners in potato-producing areas, in counties where wholesale markets are located as well as where by-product plants operate, experienced serious difficulty because of cull potatoes. In producing counties, regular and disposal orders were used for by-product loads; checking these loads at destination requires a considerable amount of work. Frequently, instead of being delivered to a by-product plant, loads of cull potatoes were traced to a wholesale produce market or a retail store where they must be rejected because of excessive defects.

There was more than the usual percentage of internal defects in the 1954 potato crop, such as net necrosis and bruising; the potatoes must be cut to determine the extent of this damage because these defects are seldom apparent from outside appearance.

In avocado-producing areas and in areas where wholesale markets are located, difficulty was experienced because of immaturity; a large number of rejections were made. Representatives of this bureau attended several meetings with avocado growers and packers to discuss uniformity of testing and inspection.

Occasionally apple dealers will re-mark boxes of apples. Three such dealers devised a clever means of removing the correct size markings from box ends (indelible ink), and then they replaced it with an incorrect size marking, denoting a larger apple; by this deception they attempted to sell their apples at a considerably higher price. Prosecution was undertaken in three such instances, and all were found guilty, and fines were levied.

Several truckers bought green corn which was severely damaged by worms; at the time of purchase they stated intention to use the corn for livestock feeding purposes. Members of this bureau discovered they were attempting to sell the corn to retail stores. Three prosecutions were undertaken, and fines were levied.

Late season artichokes were affected by small worms not detectable by outside observation. Enforcement officers in producing areas, as well as market areas, experienced considerable difficulty making inspections of artichokes damaged by these worms; a large number of rejections were made.

A number of other problems during the year caused difficulties for commissioners, their inspectors and bureau representatives; namely apricot, peach, and plum rejections because of sunburn; hot weather caused an increase in lettuce rejections for tip burn and slime; watermelon rejections increased in producing areas, particularly because of heat damage and rind rot; strawberry rejections occurred because of mold, and cantaloupe rejections increased in producing counties and market areas because of excessive bruising and a slime condition.

Highway inspection stations have been maintained at several strategic locations on main highways for examination of produce hauled by truck from the large producing and packing areas into the wholesale markets. The stations are operated seasonally every year, and funds are provided permanently. At the six stations in operation the equivalent of 67,023 carloads of produce was passed in clearances or inspected at the stations; this amount is an increase of 7 percent over the previous year. Of the total inspected, 23,782 packages of fruit and vegetables and 94 tons of watermelons were rejected.

Members of this bureau at these highway inspection stations also cooperated in the administration of marketing orders effective under state and federal laws. This service was rendered at the Beaumont Inspection Station, with reference to grapefruit and dates; at the Carpinteria Inspection Station, involving lettuce and plums; and at other stations within the State for deciduous fruit and Gravenstein apples. This activity involves checking of truckloads of these products to determine if evidence of compliance with a particular marketing order accompanies the load. If the records which accompany the loads are not complete, information of the facts in each case is quickly relayed to the proper enforcing agency.



Department of Agriculture employees inspecting tomatoes before delivery to a cannery as required by the California Agricultural Code. Note in background, the electronic instrument used to determine color of canning tomatoes in relation to the standard.

Representatives of this bureau also assisted in the supervision of standardization inspection work done by the various border quarantine stations.

Eggs

More than 56,367 lots of eggs, representing 294,699 cases, an increase of 4 percent over 1953, were inspected by agricultural commissioners, their inspectors and members of this bureau. As a result of this work, 2,273 violation notices were issued. Mislabeling as to quality and size accounted for most of these rejections, and inedibles accounted for the balance.

Emergency Standards and Department Regulations

An emergency standard under Section 790.5 was issued by the department, pertaining to lettuce standard containers. Regulations were issued by the director, pertaining to (1) establishing Date A and Date B in connection with Section 795 of the code, (2) pit burn damage to apricots, and (3) sampling of lots of containers of grapes for maturity determinations.

Standardization Marketing Surveys

With funds furnished equally by the Research and Marketing Administration, United States Department of Agriculture, and the State of California by legislative act, the Bureau of Fruit and Vegetable Standardization made investigations on nine projects; namely, maturity standards for watermelons and persian melons; color development of oranges; comparison of hydrometer to refractometer determination of soluble solids in melons; the relation of outside netting to the soluble solids of cantaloupes; development of bruising in Gravenstein apples; freezing damage measurement in Washington navel and Valencia oranges; comparative

temperature correction when testing grapes; and quality standards for cello-pack carrots.

Some of these studies should be continued to obtain final and conclusive information. Results obtained to date have been of material assistance to industry members and enforcement officials.

Seed Potatoes

The purpose of the seed potato certification program is to provide California growers with disease-free stocks of seed which will produce more tons per acre of high quality commercial potatoes.

Varieties of potatoes certified in 1954 were: White Rose, 3,722 acres; Netted Gem, 922 acres; Pontiac, 123 acres; and Kennebec, 105 acres. First field inspections were made on 4,872 acres, second on 4,457 acres, and the official certification tags were placed on sacks of seed potatoes harvested from 3,365 acres. Also, 415 acres were withdrawn by growers for diverse reasons, or were rejected after field inspections by bureau representatives. This 1954 grower record compares favorably with the 794 acres withdrawn or rejected last year. Most rejections were due to an excessive amount of bacterial ring rot; next in importance was blackleg. Other rejections were made because of nematode, wilt and mosaic.

Test plots were conducted at Half Moon Bay and Oceanside. At Half Moon Bay samples of most seed sources grown by producers were tested in the spring to obtain necessary enforcement data on stocks entered for certification. Samples from many of the fields produced under certification were tested in the winter at Oceanside. The regulations require that performance of "Foundation Stock" seed potatoes be tested by growing under controlled conditions; the Oceanside winter test plot is maintained for this purpose.

Canning Tomato Inspection

Sections of the Agricultural Code relating to this function provide that every load of tomatoes delivered for canning purposes must be inspected; a certificate will be issued if the load meets requirements. The law seeks to prevent delivery of unsuitable canning tomatoes and to provide both grower and canner with the accurate percentage of defects in every load delivered. During 1954, 1,391,296 tons of canning tomatoes were inspected and passed; 18,399 tons were inspected and rejected.

Inspection was conducted at 137 inspection stations; 57 stations were located at canneries and 80 at field assembly stations. Although February inspections were made in Imperial Valley, the main season began in July, with peak inspections following in August, September, and October. All inspections were finished by December. During the peak of the season a total of 297 inspectors was employed to carry on this inspection.

The major section of harvesting started several weeks prior to the usual beginning date; consequently, most stations began operations early even though deliveries and inspections were low in volume. The usual high peaks of volume did not occur, and the season dragged out until the middle of December. During this type of growing season, which has occurred previously, defects always increase. The appearance of sunburn, sunscald, mold, and other defects complicates inspection problems proportionately.

Use of the Agtron to grade for two color standards was a tremendous help this season.

BUREAU OF SHIPPING POINT INSPECTION

W. F. ALLEWELT, *Chief*

The work of this bureau concerns operation of an optional self-supporting inspection service conducted in cooperation with the United States Department of Agriculture. Fruits, nuts and vegetables, in producing districts throughout the State, are inspected and certified, generally on the basis of United States standards. Such work is conducted throughout the United States by state organizations cooperating with the federal department, which also maintains a correlated inspection in all important receiving markets.

Certificates of inspection, by specific legislation, are receivable as *prima facie* evidence in all courts of the State of California, and in all federal courts of the United States. Inspections are made only upon the request of persons having a financial interest in the products, principally growers and shippers. No regulatory functions or powers are involved. This service in California, from its organization in 1920, has been completely self-supporting from charges made for inspections requested and performed.

Optional United States standards have been established by the United States Department of Agriculture for all fruits, nuts and vegetables of any importance. The inspection service in California has assisted in the development of these standards for many of our fruits, nuts and vegetables, and in revisions which have been made at various times. Standards for any product usually include a series of grades, each with specific requirements covering factors of quality, condition, size, grade and pack, to determine the relative values of different lots of any commodity. The term "Quality" covers permanent characteristics of a product such as cleanliness, shape, growth cracks, scars and other blemishes. "Condition" refers to those factors which are subject to change, including maturity, freshness and diseases which may progress in shipment or storage. "Size" provisions may specify the minimum or maximum size of specimens allowed in any grade and may include a percentage of the contents of any container or lot which must be within a more restricted range of size. "Pack" refers to the use in the container of liners, pads, curtains, shims, wraps, etc., but particularly to the uniformity of size and the arrangement of the specimens, and to the tightness or filling of the container.

In making an inspection the inspector selects filled containers which are representative of the lot of produce to be certified. He removes the contents and for each container makes a detailed score covering all of the factors of quality, condition, size, grade and pack which apply to the standards for the product. When the inspection is completed he prepares a detailed certificate showing the facts as determined by his examination. Other information, including such factors as the number and kind of containers, the variety of the product, the brands or labels, the method of loading, etc., is determined and included in the certificate. Inspections usually are made in the packing house or in the field as the products are being graded, packed and loaded for shipment. Any possible assistance is given to the grower or packer in connection with harvesting, handling, sizing, grading and packing operations.

The inspection certificates based on the United States standards are very widely used throughout the United States, in Canada and other foreign markets, as the basis of sale of fruits, nuts and vegetables. They also are used in connection with claims between shippers and receivers or transportation agencies, including the settlement of cases under the Federal Perishable Agricultural Commodities Act and California marketing legislation. The service is used to insure and to show compliance with the requirements of a number of federal and California marketing orders.

The certificates are required by the United States Apple and Pear Export Act on shipments of these two products to foreign markets, and are required by the Canadian government on imports of a number of products. They furnish the basis of purchase by the United States Quartermaster Market Center of a large volume of fruits and vegetables for the armed services, and also are required in connection with various United States Government subsidy programs.

Bureau work in 1954, on approximately 50 different products, covered the equivalent of 166,000 carlots, approximately the same volume as last year, and a little below that in 1952 but considerably more than in any other year.

Work was performed under federal marketing orders covering:

- Desert Grapefruit
- Tokay Grapes
- Elberta Peaches
- Bartlett Pears
- Plums
- Surplus Almonds
- Fall and Winter Pears (Oregon-Washington-California Agreement)

Under California State Marketing Orders inspections were made on:

- Desert Grapefruit
- Bartlett Pears for Canning
- Fall and Winter Pears for Canning
- Delta Long White Potatoes

Under federal subsidy programs inspections were made on oranges, lemons and grapefruit for export and on surplus walnuts.

Ten branch offices are operated on a permanent basis, and 15 others for periods from a few weeks up to about 10 months. Each of these branch offices is under the management of an inspector with many years of experience in this work.

General direction and supervision of the work is handled by the chief of the bureau, two assistant chiefs and two supervising inspectors. This supervisory force also has the federal responsibility for conduct of this work in California.

The inspection force employed varied from a low of 93 to 97, during most of March and early April, to 318 in August, averaging 165 for the year. The inspectors are employed under state civil service by the California Department of Agriculture and are licensed by the United States Department of Agriculture.

Canning Pear Inspections. A total of 251,286 tons of Bartlett pears for canning was inspected, including 3,618 tons rejected for failure to comply with required grades. Fall and winter pears for canning totaled 26,976 tons inspected, including 400 tons rejected.

Desert Grapefruit. Inspections of desert grapefruit covered 976,687 boxes, or the equivalent of 2,114 carloads.

Regular Shipping Point Inspections. In addition to the special work on canning pears and desert grapefruit, regular shipping point inspections covered 148,371 carloads, compared with 154,710 in 1953, 159,551 in 1952 and 142,986 in 1951.

The following table shows inspections of the principal commodities, compared with figures for the three previous years.

	1954	1953	1952	1951
Potatoes -----	27,442	35,612	30,603	27,221
Grapes -----	24,952	21,351	26,266	23,489
Lettuce -----	20,517	23,403	26,029	21,536
Celery -----	16,546	16,785	14,513	13,463
Tomatoes -----	9,208	8,160	7,211	7,040
Oranges -----	6,688	9,794	9,976	8,360
Pears -----	6,100	4,848	7,129	5,145
Plums -----	6,099	6,454	3,646	6,562
Carrots -----	5,432	4,757	7,952	6,053
Peaches -----	4,919	4,748	5,241	4,340
Onions -----	3,475	3,805	4,007	4,377
Cauliflower -----	1,996	1,505	2,548	3,100
Corn -----	1,864	1,140	781	615
Cabbage -----	1,440	1,468	1,898	1,435
Apples -----	1,332	1,807	3,038	2,254

BUREAU OF WEIGHTS AND MEASURES

J. E. BRENTON, *Chief*

The following report summarizes the work of state employees, county sealers of weights and measures and deputy state sealers acting under the supervision and direction of the Director of Agriculture during the calendar year 1954.

The laws of the State of California relevant to weights and measures are contained in the Business and Professions Code, specifically, Division 5 and Division 8. In addition to provisions specifically applicable to weights and measures, as contained in Division 5 of the Business and Professions Code, there are also provisions relevant to standard bread loaf, petroleum and antifreeze which are contained in Division 8 of the Business and Professions Code. Chapter 8 of Title 4, California Administrative Code, contains specifications and tolerances relevant to commercial weighing and measuring devices and standard weights and measures.

In addition to the annual testing of all weighing and measuring devices in their respective counties, county weights and measures officials have also assisted the department in enforcement of public weighmaster laws, petroleum products inspection, the establishment of tare weights for field lug boxes used for deliveries of edible agricultural commodities to processors or other handlers, regulating the sale of antifreeze and the laws which apply to any and all commodities sold in containers.

Although there was some improvement during 1954 in adequate testing equipment procured by the counties, they still have decided need for more equipment. In addition to lack of equipment, many counties have insufficient personnel to handle increased work loads in connection with weights and measures activities.

In addition to work performed by county weights and measures officials, employees of this bureau inspected 2,287 vehicle scales, 1,678 dispensing devices used in connection with the sale and measure of liquefied petroleum gas, 553 liquefied petroleum gas vapor meters and various farm holding tanks and provers.

Employees also inspected the following county standards used by the respective county sealers of weights and measures: 3,034 weights, 170 liquid measures and 23 linear measures. Also, 32 approvals were used by this bureau for various new type weighing and measuring instruments which are to be used in California.

During the 1953-54 Fiscal Year, this bureau issued 2,375 public weighmaster licenses; 1,275 branch locations and 12,268 deputy public weighmaster licenses, a total of 15,918 licenses issued under the provisions of Chapter 7, Division 5, Business and Professions Code of the State of California.

The following table contains a recapitulation of all weights and measures inspections performed by state and county weights and measures officials during 1954.

Petroleum Products

The increase of automotive vehicles in California has resulted in an increase of retail gasoline sales, other motor fuel and motor oil for automotive purposes.

There are in excess of 82,000 retail dispensing devices being used in this State. In addition to these devices which must be inspected annually for accuracy, there are thousands of bulk motor oil containers and sealed quart cans which are also a part of the essential equipment of modern service stations and garages.

This bureau maintains state inspectors with headquarters in San Diego, Fresno, South Gate, San Francisco and Sacramento. Petroleum products laboratories are located at South Gate and Sacramento.

During 1954 state and county weights and measures officials made 65,415 inspections of service stations and garages; 1,693 citations were issued requesting adherence to the provisions as contained in Chapter 7, Petroleum, Division 8, Business and Professions Code; 5,105 samples were tested in the laboratories; 3,290 sign corrections were made; 97 office hearings were held; 89 persons were prosecuted and 87 convictions were secured.

TABLE NO. 1

Establishments visited during 1954.....	(Light.....	230,757	177,942
Packages or containers inspected.....	Correct.....	2,882,970	
	Heavy.....	757,016	
	Total.....		3,870,743
Lubricating oil bottles tested for capacity.....	Inspected.....	91,540	
	Passed.....	83,633	
	Cond. and Confiscated.....	1,255	

	Sealed without correction	Sealed after correction	Out of order	Cond. and conf.
(Counter (other than computing).....	20,988	6,840	1,656	84
Spring.....	36,336	10,579	1,498	425
Computing.....	53,794	25,645	6,379	310
Platform and dormant.....	25,951	16,368	4,199	146
Tank.....	211	149	56	
Hopper.....	705	699	194	
Livestock.....	1,459	763	297	19
Vehicle.....	2,793	2,151	881	27
Person weighers.....	9,088	2,472	1,585	121
Meat beams and steelyards.....	2,672	1,279	342	30
Abattoir (Monorail).....	1,035	871	389	8
Prescription.....	2,358	1,190	83	8
Railroad track.....	94	138	12	
Weights.....	223,374	5,671	1,123	1,737
Vehicle tank compartments gauged.....	2,185	1,837	335	
Vehicle tank meters.....	2,097	2,549	614	10
Bulk plant meters.....	480	485	112	
Retail pumps and meters.....	85,322	17,296	10,215	82
Lubricating oil meters (retail).....	1,238	177	83	1
Grease meters.....	20,919	558	1,107	77
Linear measures.....	7,222	68	190	60
Liquid capacity measures.....	82,388	713	314	229
Farm holding tanks.....	878	221	279	
Totals.....	583,587	98,719	31,943	3,374

Prosecutions.....	193
Convictions.....	209
Acquittals.....	14
Cases pending.....	32
Otherwise disposed of.....	433
Total fines paid.....	\$38,665

DIVISION OF ANIMAL INDUSTRY

DR. J. E. STUART, Chief

The functions of this division are carried on by four bureaus, namely: Livestock Disease Control, Livestock Identification, Meat Inspection and Dairy Service.

On October 1, 1954, Dr. M. E. McDonald retired as Assistant Chief of the Bureau of Dairy Service. He had served in the division since 1920. Mr. Albert E. Reynolds, Sacramento area supervisor, became Assistant Chief of the Bureau of Dairy Service, on December 1, 1954.

A new classification of Livestock Disease Control Inspector was established on October 9, 1954, in the Bureau of Livestock Disease Control, to conduct lay inspection in connection with control of livestock diseases.

The primary responsibilities of the division are:

1. Administration and enforcement of those provisions of the Agricultural Code which relate to prevention, control and eradication of communicable diseases of livestock and poultry. This is accomplished by enforcement of laws and regulations pertaining to the introduction of livestock and poultry, quarantines, diagnostic tests, vaccinations and inspections. The three major disease control projects, on a state-wide basis, are tuberculosis eradication and brucellosis control in cattle and vesicular exanthema control in swine.

2. The enforcement of standards relating to wholesomeness and quality of milk and milk products. The prevention of deception in the advertising and sale of dairy products and of fraudulent practices in the purchase of milk and cream.

3. Administration and enforcement of those provisions of the Agricultural Code which require that slaughtering and processing of meat and meat food products in counties of over 28,000 population be done in establishments operating under federal, state or state-approved meat inspection. Maintain standards for sanitary construction of meat packing establishments and prevent deception and fraudulent practices pertaining to labeling of meat products.

4. Recording of livestock brands, inspecting cattle for ownership when sold and slaughtered; investigation of livestock and the prosecution of offenders.

BUREAU OF LIVESTOCK DISEASE CONTROL

DR. H. P. BONNIKSON, *Chief*

This bureau is concerned with controlling and eradicating infectious and contagious diseases of livestock and poultry. Investigations and inspections are necessary that these diseases may be located and control or eradication measures be established when indicated.

In order that the disease control activities may be administered more effectively, the State is divided into 10 districts with a veterinarian in charge of each district.

To obtain a diagnosis or confirm a disease suspected, it is often necessary to submit specimens to a laboratory for examination. For this purpose four livestock and poultry pathological laboratories and one poultry pathological laboratory are maintained in convenient areas of the State. This laboratory service is used by members of the industry as well as practicing and state veterinarians. Construction began during November on a new Poultry Laboratory to serve the Lancaster area. The building is to be completed for use early in 1955.

Practicing veterinarians are required by Section 181 of the Agricultural Code to report communicable diseases. The reports are submitted to the district offices, which in turn forward them to the Sacramento office. A summary of diseases is tabulated and published every four months in the *California Veterinarian*.

Wherever indicated, investigations are made of diseases reported, and veterinarians are encouraged to report promptly, by telephone or wire, serious diseases which occur or may be suspected.

To protect the livestock of California importation restrictions are placed on livestock entering the State. Garbage from vessels and aircrafts is required to be incinerated or disposed of at sea. The Bureau of Plant Quarantine cooperates by making livestock inspections at border stations, seaports and air fields for prohibited livestock and products and for garbage.

Sheep Scabies Regulation No. 760, amended October 25, 1954, modified importation requirements for sheep from Arizona, Idaho, Nevada, Oregon and Washington. The requirement of a health certificate for feeding and breeding sheep from these states was removed, but a permit to enter California was still maintained. In addition the amendment brought the list of scabies-infected areas up to date.

The United States Department of Agriculture, Animal Disease Eradication Branch, cooperates with this bureau in disease control projects. Dr. W. A. McDonald is Veterinarian in charge of the California branch.

On April 28, 1954, the United States Department of Agriculture approved benzenehexachloride (BHC) and lindane as official treatment for scabies of cattle and sheep. This approval was extended only to wettable powders and not to the emulsifiable concentrates.

During July, 1954, the United States Department of Agriculture announced intensive research studies began at their Animal Disease Laboratory on Plum Island. This island, located off the northeastern point of Long Island, New York, was chosen for such research because of the rigid safety measures available there and required for the studies. The research is being conducted on vesicular diseases, including foot and mouth and other contagious diseases of livestock.

Mexico was declared free of foot and mouth disease, by the Federal Government, December 31, 1954. Although importations of cattle into the United States from Mexico were allowed after this date, all cattle shipments were restricted to the nine northern states of Mexico which had been free of the disease. The border had been closed after May 23, 1953, when an outbreak occurred in the state of Vera Cruz.

Beginning December 14, 1954, licensed veterinarians desiring accreditation in California were required to complete and sign an application form designed to elicit particular information on the veterinarian's qualifications. In addition all veterinarians accredited before that date were informed by letter of the standards expected and also notified that their accreditation may be revoked if they do not comply with conditions set forth in the application form. Accreditation is required in order to perform tests and issue livestock health certificates for interstate and foreign shipments and to participate in the brucellosis calf vaccination program as a contract

veterinarian. Because of certain irregularities, the federal-state accreditation of a practicing veterinarian was revoked.

Special visitors during the year included Dr. Stanley E. Piercy, Assistant Director of East African Veterinary Research Organization for the colonies of Kenya, Uganda and Tanganyika. Dr. Piercy is an authority on bluetongue of sheep, now occurring in California, and rift valley fever, not known to exist in the United States. In addition to discussing the above diseases he advised on the outbreaks of acute upper respiratory disease currently appearing in this State. Accompanying Dr. Piercy were two veterinarians from the United States Department of Agriculture, Washington, D. C., Dr. Jacob Traum, Chief Scientist of the Plum Island Animal Disease Laboratory, and Dr. Lawrence O. Mott, Virologist.

TUBERCULOSIS ERADICATION

Veterinarians of the Bureau of Livestock Disease Control and the United States Department of Agriculture, Animal Disease Eradication Branch, applied tuberculin tests to 616,079 cattle in 16,169 California herds under the federal-state tuberculosis control program. Animals reacting to the test numbered 815, a percentage of 0.132 in California; the national average of reactors is 0.11 percent.

Counties redesignated as modified accredited tuberculosis free areas for another three-year period were: Butte, Calaveras, Kern, Los Angeles, Madera, Marin, Mendocino, Monterey, Nevada, Plumas, Sacramento, San Benito, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Sierra, Solano, Sutter, Tehama, Trinity, Tulare.

Reports received by the Bureau of Livestock Disease Control show 11,950 cattle were tested by private practicing veterinarians during the year; three reactors were found. County livestock inspectors reported tests on 37,837 cattle, 72 of which were found to be reactors.

Tuberculin tests were conducted in 1,309 goats, among which no reactors were found.

BRUCELLOSIS

Bovine Brucellosis Control

During the year 362,733 calves between the ages of 6 and 12 months were vaccinated under the brucellosis control program. Although this total is down 2.8 percent from the previous year, 1954 marked the passing of the two millionth calf vaccinated since inception of the calfhood vaccination law, January, 1948; a total of 2,057,525 animals have been vaccinated, identified by tattoo and reported in that period. Vaccination of these animals is performed by licensed practicing veterinarians, under contract with the State of California, assisted by state and federal regulatory veterinarians. The project is supervised by district veterinarians in the bureau's 10 district offices throughout California.

In one instance, where irregularity was suspected, investigation produced evidence which resulted in cancellation of the calf vaccination contract of the practicing veterinarian.

Calf vaccinations conducted during 1954 by counties are shown in Table I.

Adult Vaccination

Another phase of the brucellosis control program, in addition to the vaccination of calves, is covered by Section 754.3 of the brucellosis regulation which became effective January 20, 1954. This section provides for official recognition of brucellosis vaccination of adult cattle provided they are negative to an agglutination test for the disease, properly identified by tattoo in the right ear and reported. This section was amended, effective February 9, 1954, to change the official tattoo of adult vaccinates from AV followed by the last numeral of the year vaccinated to **A C** (C superimposed over V) followed by the last numeral of the year vaccinated. This amendment provided for the use of the symbol C which is also used in identifying officially vaccinated calves and is registered with the Secretary of State for this purpose.

During the first year of officially recognized adult cattle vaccination for brucellosis, 581 adult cattle were reported vaccinated.

Brucellosis Testing

Although the law does not provide for compulsory testing of cattle for brucellosis, it does require, under Section 754 of the brucellosis regulations, that results of all such tests be reported to the Department of Agriculture by the laboratory or

veterinarian conducting the test. The law also provides that all cattle reacting to such tests be identified by branding with the letter B on the left jaw, except officially vaccinated animals.

The results of brucellosis tests of cattle reported during 1954 are as follows: lots tested, 1,769; cattle tested, 18,035; negative, 16,112; suspicious, 1,220; positive 682.

Included in the 682 animals reacting to the test were 296 not subject to branding since they showed evidence of official vaccination.

In a move to expand the existing brucellosis control program the United States Department of Agriculture, Animal Disease Eradication Branch, from funds made

TABLE NO. 1
BRUCELLOSIS CALF VACCINATION
Summary—1954—(Calendar Year)

County	Dairy female	Dairy male	Beef	Total	Number dairy ranches	Number beef ranches	Total
Alameda	2,164	12	1,697	3,873	173	60	233
Alpine			1,734	1,734		16	16
Amador	133	1	644	778	17	40	57
Butte	2,870	55	2,480	5,405	445	120	565
Calaveras	69		1,146	1,215	21	46	67
Colusa	683	13	1,690	2,386	84	39	123
Contra Costa	971		2,472	3,443	68	78	146
Del Norte	796	17	157	970	83	6	89
El Dorado	72	2	564	638	21	37	58
Fresno	14,793	116	3,790	18,708	1,389	145	1,534
Glenn	4,457	74	902	5,433	530	44	574
Humboldt	5,849	104	1,534	7,487	732	75	807
Imperial	3,108	16	426	3,550	175	11	186
Inyo	179	2	1,348	1,529	6	13	19
Kern	2,620	21	9,168	11,809	184	109	293
Kings	10,554	69	506	11,129	873	9	882
Lake	297	4	541	842	53	36	89
Lassen	182	2	5,724	5,908	13	109	122
Los Angeles	11,442	121	863	12,426	638	53	691
Madera	7,145	40	1,188	8,373	592	43	635
Marin	7,513	18	652	8,183	359	35	394
Mariposa	168	11	688	867	12	14	26
Mendocino	924	13	2,117	3,054	138	59	197
Merced	23,635	213	6,442	30,290	2,258	107	2,365
Modoc	176		12,067	12,243	28	216	244
Mono	3		1,749	1,752	2	16	18
Monterey	4,182	36	4,588	8,806	334	113	447
Napa	1,068	7	679	1,754	111	36	147
Nevada	244	12	382	638	69	30	99
Orange	3,165	59	2,044	5,268	187	17	204
Placer	1,162	14	781	1,957	185	50	235
Plumas	92		1,920	2,012	12	57	69
Riverside	5,136	40	264	5,440	367	21	388
Sacramento	6,210	80	2,875	9,165	941	159	1,100
San Benito	648	8	4,057	4,713	66	72	138
San Bernardino	4,694	19	158	4,871	375	29	404
San Diego	5,143	30	2,153	7,326	397	77	474
San Francisco							
San Joaquin	18,148	177	3,239	21,564	2,020	154	2,174
San Luis Obispo	3,031	23	2,933	5,987	268	106	374
San Mateo	1,823	15	257	2,095	85	13	98
Santa Barbara	3,018	15	7,544	10,577	176	136	312
Santa Clara	4,026	33	1,461	5,520	339	71	410
Santa Cruz	881	9	587	1,477	145	60	205
Shasta	1,086	10	2,435	3,531	183	121	304
Sierra	67		534	601	3	15	18
Siskiyou	852	6	5,548	6,406	137	165	302
Solano	1,698	54	2,061	3,813	159	51	210
Sonoma	11,990	57	1,452	13,499	1,342	107	1,449
Stanislaus	29,987	266	2,665	32,918	3,395	84	3,479
Sutter	1,777	12	804	2,593	188	59	247
Tehama	2,216	24	3,715	5,955	309	98	407
Trinity	84		166	250	26	3	29
Tulare	16,291	173	2,988	19,452	1,178	130	1,308
Tuolumne	86	1	917	1,004	20	19	39
Ventura	1,616	88	2,496	4,200	62	49	111
Yolo	1,309	9	1,935	3,253	185	70	255
Yuba	1,309	3	751	2,063	127	49	176
Totals	233,842	2,204	126,687	362,733	22,285	3,757	26,042

available by Congress for that purpose, agreed to reimburse practicing veterinarians, who perform official calfhood vaccination work for all lots of five calves or less vaccinated after January 1, 1955. Reimbursement will be on the basis of \$2.50 per stop in addition to 75 cents per calf vaccinated. Vaccine will be tested and furnished by the State of California, as in the past. To qualify for additional fees for small lots of calves vaccinated, veterinarians must be licensed and accredited, hold a contract with the State of California to officially vaccinate calves and be approved by the United States Department of Agriculture, Animal Disease Eradication Branch, for employment on a fee basis.

It is felt the added incentive of \$2.50 per stop will encourage and stimulate the official vaccination of small lots of eligible calves; the goal of 100 percent of all dairy-type calves within the State included in the program may thereby be realized.

To be effective, the struggle to eradicate or control diseases of animals must never become static. Recent efforts to enhance existing knowledge of the significance of blood titers observed in the agglutination test for brucellosis in cattle have resulted in changes in the interpretation of that test as it applies to animals vaccinated with strain 19 brucella abortus vaccine. Previously all bovine agglutination tests, irrespective of the vaccination status of the individual, were interpreted as follows:

<i>Dilutions</i>			<i>Diagnosis</i>
1:50	1:100	1:200	
—	—	—	Negative
I	—	—	Suspicious
+	—	—	Suspicious
+	I	—	Suspicious
+	+	—	Positive
+	+	I	Positive
+	+	+	Positive

At a meeting of the United States Livestock Sanitary Association at Omaha, Nebraska, during November, 1954, a revised interpretation of bovine brucellosis tests of cattle officially vaccinated with strain 19 brucella abortus vaccine was adopted. This interpretation as shown below, was subsequently approved by the Animal Disease Eradication Branch, Agricultural Research Service, United States Department of Agriculture, and adopted by this bureau, December 22, 1954:

<i>Dilutions</i>			<i>Diagnosis</i>
1:50	1:100	1:200	
—	—	—	Negative
I	—	—	Negative
+	—	—	Negative
+	I	—	Suspicious
+	+	—	Suspicious
+	+	I	Suspicious
+	+	+	Positive

The former interpretation however will still be considered standard for animals which have never been vaccinated with strain 19 brucella abortus vaccine.

Further study of blood titers in cattle in relation to natural infection and the shedding of organisms in milk is being conducted by the University of California School of Veterinary Medicine, with assistance from the United States Department of Agriculture, Animal Disease Eradication Branch, in this State. It is hoped this study will assist in the evaluation of immunity derived from use of strain 19 vaccine; in addition, efforts to differentiate between the blood titers of animals due to vaccination and those present because of exposure to natural infection may be advanced.

Work in this experimental field is conducted at Del Norte, Sacramento, Marin, Sonoma and Stanislaus Counties.

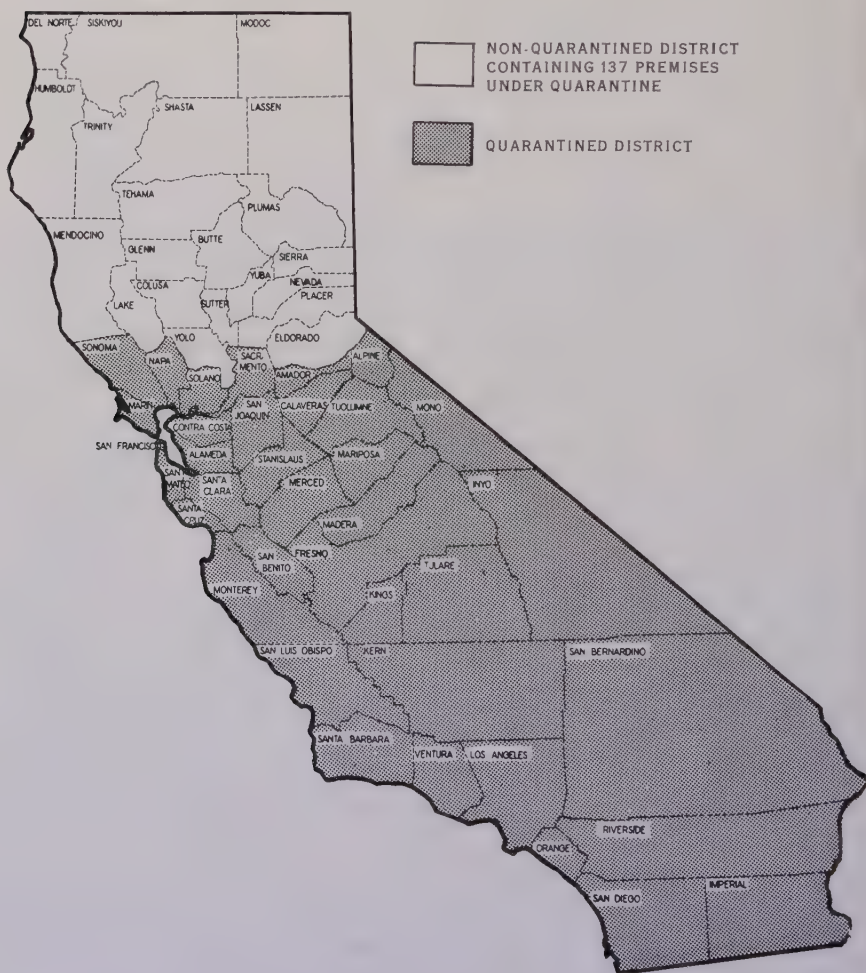
Swine Brucellosis Control

Control of brucellosis in swine continued on a voluntary basis. Owners who sign an agreement form and have two successive brucellosis free tests on their animals not less than 30 days apart are granted a brucellosis free certificate. To retain this certificate the herd must be given annual tests to determine freedom from the disease.

At the end of the year 15 of the 22 owners participating in the program held brucellosis-free certificates.

March 19, 1954, marked an important milestone in the progress to control vesicular exanthema of swine in California. On that date Article 6—Vesicular Exanthema Quarantine Regulation—became effective; it established a nonquarantined district in 21 northern counties and a quarantined district for the remainder of the State. (Indicated by Map No. 1.) The nonquarantined area consisted of the following counties: Butte, Colusa, Del Norte, El Dorado, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sutter, Tehama, Trinity, Yolo, and Yuba. The regulation provided for control of the movement of swine and swine products within and from a quarantined district, for the control of the movement of garbage into the nonquarantined districts and for the cleaning and disinfecting of common carrier vehicles and public stockyards transporting or handling swine infected with or exposed to vesicular exanthema.

On or about that date all hog ranches on which raw garbage was being fed were placed under hold order. Movement of hogs from these ranches was not allowed unless a permit issued by a representative of this bureau accompanied such shipments. Ranches on which cooking of garbage was maintained in a satisfactory

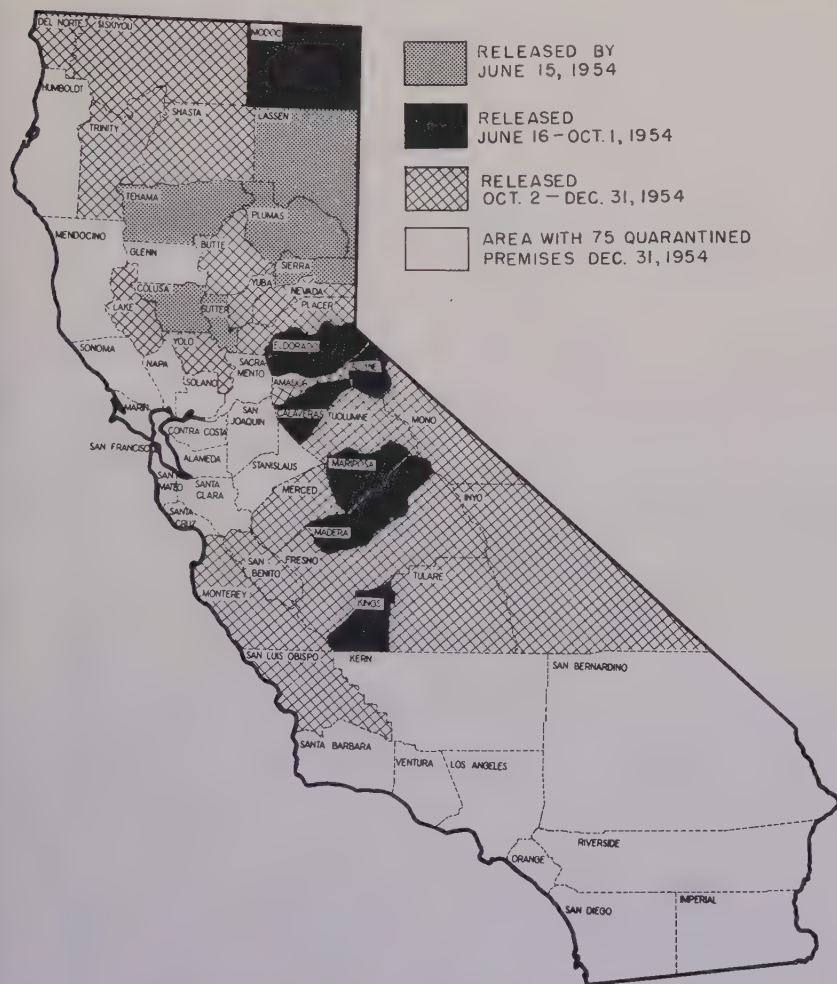


Quarantine District established March 19, 1954, to control vesicular exanthema of swine.

manner for 30 days were released from hold order, providing vesicular exanthema had not existed on the premises for eight months and provided the swine had not been infected with or exposed to the disease. Cooking for 30 minutes at 212 degrees F. is considered satisfactory. When released the owners of ranches located in the nonquarantined area could then sell their hogs unrestricted throughout the State. However, hogs from ranches released in the quarantined area were limited to move within that area.

The Animal Disease Eradication Branch, United States Department of Agriculture, in cooperation with the bureau, also released, March 19, 1954, the federal quarantine on 21 Northern California counties in the nonquarantined district. This release permitted swine producers and processing plants under federal inspection in such sections, with the exception of ranches under individual quarantine, to market their products in other states in compliance with federal interstate requirements. The federal quarantine was originally established on July 29, 1952.

Section 791.1—"Movement of Garbage"—of the Vesicular Exanthema Quarantine Regulation was amended March 22, 1954, to clarify the manner in which garbage



Progress of the vesicular exanthema control program during 1954 showing the counties which were entirely released from quarantine.

may be moved from a quarantined district and to prohibit the feeding of raw garbage to swine in any area declared a nonquarantined district.

A new section, No. 794, was added to the Vesicular Exanthema Regulation, July 21, 1954, to permit purebred swine not fed raw garbage to be exhibited at fairs and to be entered in purebred swine sales, but not to sales where commercial hogs were sold.

By request of the industry and as a result of public hearings, the director amended the Vesicular Exanthema Regulation, July 29, 1954. This amendment extended the nonquarantined area to the remaining 37 California counties, effective October 1, 1954. Thus, on that date the entire State became a nonquarantined district, except those individual premises on which raw garbage had been fed to swine within 30 days or on which swine existed which had been affected or exposed to vesicular exanthema. To conform with federal requirements, the amendment changed the period of quarantine for affected hogs from eight months to a time when all hogs, which had been affected, were disposed of; provisions were also included to provide a feasible method of marketing, under permit, swine which had been exposed to or infected with the disease. In order to bring the Vesicular Exanthema Regulation up to date with the changes which took place on October 1, the regulation was entirely revised by amending each section, except Section 792.1 which remained unchanged. The progress of this control effort during the year is summarized in Map No. 2. A complete progress report to October 1, 1954, was published in the July-August-September, 1954, *Quarterly Bulletin*, California Department of Agriculture.

All sales yards and slaughtering establishments were handling only swine from nonquarantined areas on October 1, 1954. A procedure therefore was developed to enable dump swine-feeders, who were unable to dispose of their swine by October 1, 1954, to market their hogs in regular marketing channels in order to liquidate their dump-feeding operations. This procedure was allowed if no more hogs were added to the dump and provided the animals were not or had not been infected or exposed to vesicular exanthema. A clean area away from the dump was established by the operators, where a lot of hogs, feeding exclusively on grain or cooked garbage, were to be taken for a period of 30 days. At the end of this period this lot of hogs could be shipped to market under permit for direct slaughter. This procedure, repeated until all dump hogs were removed, was to terminate on February 15, 1955; the feeders agreed this period allowed sufficient time to liquidate their dump operations.

At the close of the year there were 526 garbage feeding hog ranches throughout the State. Because of the regulation, cooking of garbage has been extended to 483 of these ranches. Only 75 premises, several of which were preparing to qualify for release, remained under state-federal quarantine on December 31, 1954.

Results of quarantine measures and extension of garbage cooking in California had a marked effect in reducing vesicular exanthema outbreaks during the year. Only 49 outbreaks occurred, all on garbage ranches, compared with 129 during 1953. A tabulation of outbreaks during 1954 is as follows:

TABLE II
Vesicular Exanthema Outbreaks

County	1954		Garbage Ranches
	Month	Garbage Ranches	
Alameda	January	8	
Contra Costa	February	4	
Kings	March	8	
Los Angeles	April	5	
Monterey	May	5	
Napa	June	4	
Orange	July	3	
Sacramento	August	5	
San Bernardino	September	3	
San Joaquin	October	2	
San Mateo	November	2	
Santa Barbara	December	0	
Santa Clara			
Tulare	Total	49	
Total		49	

The majority of outbreaks were in San Mateo County, where the infection has been of long standing; many of these ranches on which infection occurred are in close proximity to each other.

A report from the United States Department of Agriculture shows that at the end of 1954 only six states, namely, California, New Jersey, Massachusetts, New York, Rhode Island, and Connecticut, had areas or ranches under quarantine for vesicular exanthema and that cooked garbage was being fed on 80 percent of all garbage-feeding premises in the United States. On these premises where garbage is being cooked, 70 percent of all garbage-fed swine of the Nation are located. There are 42 states which have garbage cooking laws or regulations.

BLUETONGUE OF SHEEP

Outbreaks of bluetongue during 1954 were generally very mild. The first case was reported in early July, and the final case occurred on November 8, 1954. A tabulation of the incidence is as follows:

Number of flocks affected -----	36
Number of sheep involved -----	25,576
Number of sheep affected -----	1,130 or 4.4 percent of the sheep involved
Number of sheep died -----	265 or 23 percent of the affected sheep

During the last three years bluetongue has been reported in the following counties:

<i>County</i>	<i>1952</i>	<i>1953</i>	<i>1954</i>
Amador -----	—	—	x
Calaveras -----	—	—	x
Colusa -----	x	x	x
Fresno -----	x	x	x
Glenn -----	x	x	—
Kern -----	—	x	x
Kings -----	—	x	x
Madera -----	—	x	—
Mariposa -----	—	—	x
Merced -----	—	—	x
Modoc -----	—	x	x
Napa -----	x	—	—
Placer -----	—	x	x
Riverside -----	—	x	x
Sacramento -----	x	x	—
San Bernardino -----	—	x	x
San Joaquin -----	x	x	x
Santa Barbara -----	—	x	—
Solano -----	x	x	—
Sonoma -----	x	—	—
Stanislaus -----	x	—	x
Sutter -----	—	x	x
Tehama -----	x	x	x
Tulare -----	—	x	x
Yolo -----	x	x	x

A preventive vaccine was made available by three commercial laboratory firms on July 8, 1954. Practicing veterinarians immediately began vaccinating large numbers of sheep to protect against the disease. It was estimated that 400,000 sheep had been vaccinated in the State during the year. No cases of outbreaks were reported in vaccinated flocks. The use of this vaccine no doubt contributed to the marked reduction of bluetongue which occurred during the year. The number of cases during 1954 was 87 percent less than those recorded during 1953.

HYPOPLASIA OF NEWBORN LAMBS

During the fall lambing season, sheep owners reported some unusual losses in newborn lambs, all of which were from ewes vaccinated against bluetongue. Many of the affected lambs were unable to get on their feet, lying on their side and struggling until death. Others were able to walk about but with head down, standing in a corner or against some object and nursing only when helped. Some were born dead or deformed. A few lambs were apparently normal at birth but were found,

in about 10 days, showing symptoms of a dummy standing in one place behind the flock. Upon autopsy the most striking lesions were in the brain. It was usually degenerated and atrophied, with the cranial cavity filled with clear fluid. Brains which were normal in size were inflamed or had hemorrhages on the surface, but by histopathology were found to be degenerated. Hemorrhages were found on the heart and thymus gland in some cases.

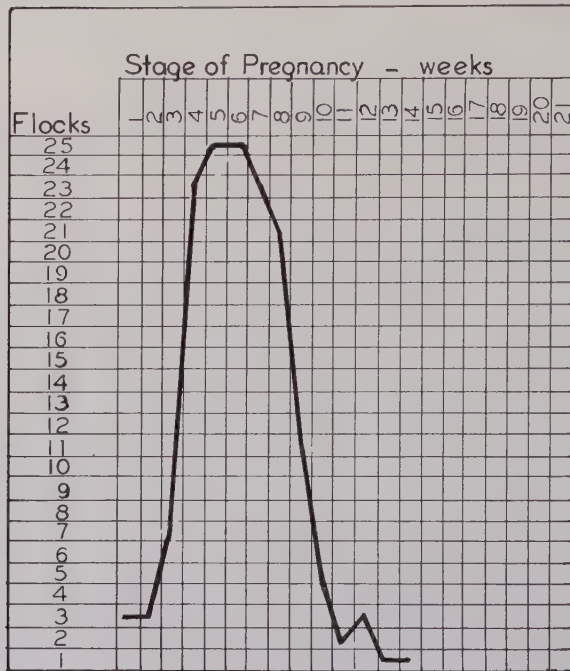


TABLE No. III

A survey was made of the flocks throughout the State to determine the extent of the losses. Twenty-nine flocks containing 41,760 ewes were involved; approximately 2,124 lambs were affected. Results of the survey charted in Table No. III, show the state of pregnancy at time of vaccination. The majority of affected lambs were from ewes that were four to eight weeks pregnant at the time bluetongue vaccine was administered. Thus, to avoid these losses, it is recommended that ewes be vaccinated against bluetongue prior to or after pregnancy.

ANTHRAX

Only 15 outbreaks of anthrax were reported during 1954, six in beef cattle and nine in dairy cattle. These occurred in counties, as follows: two in Colusa; three in Fresno; one in Los Angeles (one bull imported from Idaho for slaughter); one in Marin; four in Merced; two in San Joaquin; one in San Luis Obispo; and one in Sonoma. All of these outbreaks, with the exception of the single case in Los Angeles County, occurred in areas where anthrax has been reported previously. Anthrax occurred five years ago at the Sonoma County ranch.

The bacteria causing the disease perpetuates itself by forming spores which are very resistant and may remain virulent for long periods of time, especially in the soil; therefore, to control the infection, in addition to vaccinating against the disease, it is important to properly dispose of all anthrax carcasses usually by burning or deep burial, covering the carcass with lime so that contamination of the soil may be minimized.

Anthrax can be prevented by vaccination. This vaccination is especially important in anthrax areas or sections where the disease is known to occur. Cattle should be vaccinated during the spring months in order that immunity be developed prior to the advent of hot weather.

EQUINE ENCEPHALOMYLITIS

The incidence of equine encephalomyelitis, or sleeping sickness of horses, was relatively low during 1954; only 43 horses and mules were reported affected, nine of which died from the infection. The disease occurred in 21 counties in all general sections of the State. Stanislaus County had the largest number, eight cases; Fresno County had four; Orange and Modoc Counties had three each; the other 17 counties had only one or two each. The disease occurs each year mostly during the summer and is prevented by an annual vaccination recommended during the spring. Practicing veterinarians reported 2,497 vaccinations during the year.

CATTLE SCAB

On January 13, 1954, federal officials notified this bureau that scabies had been found in a herd of cattle, near Phoenix, Arizona, which had been imported from Colorado during October, 1953; 13 cattle exposed to the infected herd had been shipped into California, January 7, 1954, to a feed lot near Calexico, Imperial County.

Inspectors of this bureau examined these cattle in a chute, by hand, January 16, 1954, and found them infested with scab mites. These 13 cattle, in addition to 122 exposed to them, were sprayed under official supervision with benzene hexachloride (BHC) solution, two treatments 10 days apart, to eradicate this outbreak. On February 1, 1954, further information was received from federal officials that a lot of 941 yearling steers had been shipped from a scabies-infested herd at Lamar, Colorado, November 9, 1953, to a feed yard at Thermal, Riverside County. These cattle were quickly located, February 3, and found infested with scab mites. They had exposed others, involving a total of 1,994 cattle. A dip vat was constructed at the feed yard and all infected and exposed cattle were dipped twice, 10 days apart, in BHC solution.

As a result of this discovery of scabies, a survey was made of the southern counties. On a survey inspection, February 16, scabies was found in a large feed lot at Blythe, Riverside County, among a lot of 74 cattle which had originated at Eagle Pass, Texas, and arrived at Blythe October 7, 1953. Because these cattle were ready for market, they were dipped once in lime and sulfur solution, along with 45 additional exposed cattle in the yards, shipped to an establishment and slaughtered.

In each outbreak the State Pathological Laboratory determined the cause to be the psoroptic or common scab mite.

In an effort to prevent any further introduction of cattle scab into California from known infested areas, Cattle Scabies Regulation No. 757 was adopted as an emergency regulation, February 11, 1954. This regulation required all cattle imported from Arizona and Colorado to be accompanied by a permit obtained in advance from this bureau and by a health certificate issued by a qualified veterinarian in the state of origin. The certificate must show that the cattle had been inspected and found free from and not exposed to scabies or that treatment of the cattle was completed under federal or state supervision within 10 days prior to arrival in California. This regulation was again amended on February 25 to include all cattle from the state of Texas; a third amendment, April 31, added the states of Kansas and Oklahoma to the scabies-infected areas and allowed shipments from these states of cattle for immediate slaughter without the necessity of obtaining a permit and health inspection certificate, providing they did not originate from areas under quarantine for cattle scabies. The regulation was repealed July 1, 1954, for cattle scab was considered eradicated in the five above named states, as well as in California.

SCRAPIE OF SHEEP

Only one premise remained under hold order, at the close of 1954, for having progeny from rams exposed to flocks in which scrapie occurred during August, 1952. Scrapie has not been observed in California since the eradication of that outbreak. During August, 1954, information was received that the disease was diagnosed in one ewe in Oregon. The entire flock of 16 head was reported slaughtered by August 27. The sire and dam of this affected ewe were traced back to a purebred flock from which a large number of rams had been imported into California. Each animal imported from this purebred flock since 1950 was being traced as far as possible; all sheep involved were inspected for symptoms of the disease. Because of the unusually long period of incubation (up to three years), these sheep will be held under surveillance for three years.

JOHNES' DISEASE

This disease was diagnosed in cattle on five premises and in one Sonoma County sheep flock.

The infection was also found in one bovine animal in each of the following counties: Nevada, Santa Clara, Butte, Sacramento, Fresno, and Marin. In each case the diagnosis was confirmed at a State Pathological Laboratory by finding the acid-fast bacteria *Mycobacterium paratuberculosis* in the intestinal mucosa or mesenteric lymph glands of the affected animals. To control the disease in herds where the infection has been diagnosed, affected animals should be isolated, the entire herd tested with johnin and retested as indicated. Reactors to the test should be removed and slaughtered or kept separate from the herd. Sanitary measures should be carried out as far as possible. Because of the slow developing chronic nature of the disease, it is difficult to eradicate, especially where the infection has become well established in a herd.

EQUINE INFECTIOUS ANEMIA (Swamp Fever)

On February 14, 1954, a horse from San Joaquin County was admitted to the clinic of the Veterinary College at Davis, because of a disease condition that had persisted for the previous five or six months. The clinical diagnosis of equine infectious anemia or swamp fever was concurred in from reported history and symptoms by the Animal Disease and Parasite Research Branch, United States Department of Agriculture, Washington, D. C.

Blood from this horse was inoculated into two test horses to prove the diagnosis by transmission and to study the disease. These two test horses, maintained in isolation quarters and screened to protect against insect carriers, showed intermittent rises of temperature which is usual in this disease.

Upon recommendation of this bureau and with the owner's consent, the affected horse was destroyed, April 22, 1954.

ACUTE UPPER RESPIRATORY DISEASE

The acute upper respiratory disease affecting cattle on several dairies in the Los Angeles area during the fall of 1953 continued into the winter months of 1954. The disease occurred in Los Angeles, Orange, San Bernardino and Riverside Counties, in the southern part of the State; on January 10, 1954, it was found in a dairy herd in San Joaquin County. A tabulation of the outbreaks occurring during the fall of 1953 and winter of 1954 shows the disease was on 60 dairies involving 15,467 cattle, of which 1,161 were affected and 26 died. The disease was largely characterized by sudden onset with fever preceding the symptoms, loss in milk production and a severe inflammation of the trachea, larynx and pharynx. In the San Joaquin County outbreak a few affected calves showed a marked conjunctivitis and a copious white mucous discharge from the eyes. The disease outbreaks subsided on March 4, 1954; however, the disease was diagnosed in the beef cattle of a large feed yard near Manteca, San Joaquin County, July 17, 1954. In addition to the acute upper respiratory symptoms, these beef cattle showed incoordination of the hind quarters and knuckling over of the limbs while walking. There were 12,000 cattle on feed at this yard; 300 were affected and 32 deaths occurred. On September 1, 1954, the condition reappeared in dairy cattle of Los Angeles and Orange Counties, affecting 194 cattle with four deaths by the close of the year. This series of outbreaks was much milder than had occurred previously.

TABLE IV
Outbreaks of Acute Upper Respiratory Disease During 1954

County	Herds	Cattle involved	Cattle affected	No. deaths
Los Angeles -----	38	9,468	485	14
Orange -----	10	2,389	177	3
Riverside -----	1	330	1	0
San Bernardino -----	7	1,505	142	0
San Joaquin -----	2	12,150	383	34
Total -----	58	25,842	1,188	51

A trouble resembling this acute upper respiratory condition was reported in several feed lots of the State. The beef cattle had diphtheritic lesions on the membranes of the mouth, pharynx, larynx and trachea and some ulceration of the nasal mucosa. Severe cases showed labored breathing, with the head extended. This condition in feed-lot cattle resembles a similar condition reported to be occurring in similar cattle of other western states and referred to as necrotic rhinitis and tracheitis. It appeared that symptomatic treatment and treatment with antibiotics gave some beneficial results.

In each outbreak, wherever possible, attempts were made to isolate a causative organism by submitting material to State Pathological Laboratories and to the Veterinary College at Davis. The cause has not yet been determined, and attempts to reproduce the disease from this material have failed.

AN INFECTIOUS DISEASE IN DAIRY GOATS

During March, investigations were made of losses in a herd of 95 dairy goats near Modesto, Stanislaus County; 26 of the herd had died. Both kids and does were affected with stiffness, lameness and painful swellings of the leg joints.

Chick embryo inoculations, made at the State Pathological Laboratory, of material from the affected animals indicated possibility of a pleuro-pneumonia like organism to be the cause. Research veterinarians at the Veterinary College, Davis, made extensive studies of the disease in this goat herd and another smaller dairy goat herd nearby in which the infection was less virulent.

The cause of the disease was definitely established by the research workers to be an organism resembling that found in goat pleuro-pneumonia; however, in this outbreak no respiratory symptoms or lesions were observed. The disease appeared to have subsided. The kids were taken immediately after birth to another ranch and so far have been raised with no evidence of the trouble.

VIRUS DIARRHEA OF CATTLE

An infectious disease of cattle, characterized by profuse diarrhea and named Virus Diarrhea, diagnosed in the state of New York in 1946, was recently confirmed in Maine.

On January 11, 1954, a 10-month-old steer showing symptoms of this disease was admitted to the clinic of the School of Veterinary Medicine at Davis. The animal originated from a herd where seven steers had died within the previous three months from a similar condition. The affected animals were scouring, failed to eat and were markedly depressed; their temperatures were moderately high. Autopsy showed the lining of the oesophagus to have small eroding ulcers; the large and small colon were inflamed. In the rectum there were erosions and deposits of fibrin. Some necrosis of the liver was noted. Research veterinarians at Davis were able to reproduce the disease from affected animals.

By means of cross immunity tests in calves, the disease was definitely diagnosed as virus diarrhea, immunologically identical with the New York strain of the virus.

ARTIFICIAL INSEMINATION OF ANIMALS

Artificial insemination services were conducted in 47 counties. Twenty-four organizations or "bull rings" conducted these services. In addition, 14 cattle owners were reported conducting artificial inseminations within their own herds with semen from their own bulls.

Groups	No. of organizations	No. of operators	No. of first service inseminations
Organized Artificial Breeding Assn.-----	8	171	226,012
Independent artificial breeding groups-----	16	44	20,887
Private herd owners "within herd" only--	14	14	6,540
	38	299	253,439

Approximately 30 percent of California's adult female dairy cattle population are now being inseminated artificially. This was an increase of 7 percent over 1953 when 203,484 first inseminations were reported.

LIVESTOCK AND POULTRY PATHOLOGY LABORATORY San Gabriel

Laboratory examinations and tests of various kinds are recognized by veterinarians and the livestock industry as necessary aids in the diagnosis and control of the many disease problems. It is particularly noticeable that poultrymen become more concerned about poultry health and high production when there is an economic stress. Except for the first part of the year 1954, the income from egg production was not favorable, and profits from poultry meat were poor throughout the year.

DISEASES OF POULTRY

There was a high incidence of poultry disease during the year, as evidenced by 4,071 cases being submitted for examination, comprised of 16,847 birds and specimens, the greatest number ever recorded here.

The most serious diseases of chickens are those involving the respiratory system. Of the total number of diagnoses of chickens, more than 50 percent respiratory infections. Because of these diseases, which occur more frequently in the age range of 2 to 14 weeks, it is extremely difficult to establish a program of preventive vaccination, particularly with the live virus vaccines. It is during this period that vaccines should be administered. Much time is spent in discussing vaccination problems with poultrymen.

Methods of diagnosis have greatly improved, and full advantage is taken of new bacteriological, serological, and viral techniques, and several hundred test chicks were used to arrive at a factual diagnosis. Measures for control, however, have not improved greatly.

Chronic Respiratory Disease (C.R.D.)

This disease syndrome is described as being caused by pleuro-pneumonia-like organisms (P.P.L.O.), but it is thought to be usually associated with other specific infections or poor environment. Infectious bronchitis appears to be the most prominent concurrent disease involved. Significant lesions are a chronic tracheitis and infected air sacs. Often this condition is classified and recognized by poultrymen as air sac infection. The mortality may be high, but perhaps slow growth and loss of flesh are more significant. Time does not permit definite identification of the causative agent in all suspected cases of C.R.D., but in order to become more familiar with the disease, P.P.L.O. cultural studies on artificial media were made in a number of outbreaks.

Infectious Bronchitis

This disease is known to be rather widespread throughout the State and because it has often been demonstrated in association with air sac infection, immunization against infectious bronchitis is being attempted. Several commercial vaccines have been officially approved for distribution after having passed certain tests for potency and safety. Many poultrymen desire to learn if the laying stock is immune before introducing the vaccine on the ranch. There were 176 groups challenged during the year, 125 or 71 percent of which were found to be immune. Infectious bronchitis vaccine has apparently been helpful on some ranches; however, it has not noticeably influenced the general disease situation in this area.

Laryngotracheitis

This can be effectively prevented by vaccination with a proper dose of a potent vaccine correctly administered. Last March a flare-up of the disease occurred in many flocks, some of which had been vaccinated. Laboratory studies proved one vaccine to be impotent. Several serials of another suspected vaccine were found to give satisfactory immunity against strains of field viruses, and conversely field viruses proved to immunize against the commercial vaccines tested. These laboratory tests suggested poor vaccination techniques in vaccinated flocks. In November and December outbreaks of laryngotracheitis were reported in recently vaccinated flocks and in others vaccinated several months previously. Laboratory tests of the vaccine used indicated low potency and poor immunizing properties. There were 56 diagnoses in December and 288 during the year, nearly twice the usual number.

Infectious Coryza

Coryza-like symptoms and autopsy lesions caused by other specific respiratory infections are difficult to differentiate from true infectious coryza caused by *Hemo-*

philus gallinarum. For lack of time it is not practical or possible to identify the causative agent of all cases of infectious coryza. For one month all suspected cases were cultured. *H. gallinarum* was isolated from 78 percent, which proves the importance of the disease. It is often found to be a predisposing factor, or associated with chronic respiratory disease.

A request was made to assist the University Extension Service in cooperation with three Farm Bureau member poultrymen on a study of poultry diseases on their ranches. Representative samples of chicks through the brooding and growing periods were submitted at intervals to be checked for disease. Approximately 50 lots of birds, comprised of 200 specimens, were examined during a period of 16 weeks.

Some unusual cases of young chickens were submitted with eye lesions, which did not resemble the common known infections. Laboratory studies revealed the presence of Newcastle disease virus in the aqueous humor. These findings resulted in the development of a rapid method of detecting Newcastle disease in the early stages. The experiments are reported in the Amer. Jr. Vet. Res., January, 1955.

Outbreaks of turkey diseases are rather infrequent, and in general the turkey producers are well prepared to handle the common conditions as they arise. Apparently Newcastle disease in turkeys is on the increase in this area and we believe preventive vaccination of potential breeding flocks is indicated.

DISEASES OF MAMMALS

The total number of cases of mammals again showed an appreciable rise over the previous year. Most significant was the number of cattle accessions, in which there was a 50 percent increase.

A disease outbreak of cattle in feed yards in Riverside County was responsible for a rather high mortality. It usually occurred following the introduction of new groups of animals. On post-mortem examination the significant lesions reported by the attending veterinarian were diphtheritic membranes of the larynx and trachea. These tissues were submitted to the laboratory as possible *S. necrophorus*, but this infection was eliminated by bacteriological and animal inoculation studies.

Because the lesions were similar to those found in the upper respiratory infection of dairy herds in Southern California in 1953 and 1954, further investigations were made. District veterinarians, who were familiar with those outbreaks in the dairy herds, studied the epidemiology and symptoms in the feed yards. It was their belief that the manifestations were different.

The onset of the disease is usually characterized by symptoms of temperatures of 104 degrees to 106 degrees, grinding of teeth, dyspnea, lacrimation, and a mucopurulent nasal discharge. As the disease progressed, animals appeared gaunt, and some showed nervous symptoms, characterized by incoordination. Autopsy lesions included sinusitis, diphtheric laryngitis and tracheitis. Along with this there was usually pneumonia, pleuritis, and pericarditis. Frequently there was a mucoid gastroenteritis, and moderate peritonitis. Animals with nervous involvement showed severe meningitis, encephalitis, and myelitis.

Bacteriological cultures often yielded *Pasteurella* sp., which were found to be highly pathogenic for guinea pigs. It is very probable, however, that the *Pasteurella* infection may be secondary to a virus. Stress during shipment, poor environment, and secondary infections may increase the severity of the disease, while under more favorable conditions the disease would be less pronounced.

Menges, Harshfield, and Wenner, in the April, 1953, Jr. AVMA described sporadic bovine encephalomyelitis, the symptoms and pathology of which resembled this condition in many respects. Histological sections, therefore, were prepared from the brain, spinal cord, liver, kidney, spleen, lung, and other respiratory tissues. These sections, particularly of the brain, revealed lesions suggestive of this disease. Slides were submitted to members of the Department of Animal Pathology, University of California, for their study. Further limited studies are being made in the San Gabriel Laboratory in an attempt to isolate a virus by inoculation of laboratory animals and chicken embryos.

Bovine abortions continue to present a baffling problem. In many cases bacteriological and serological studies eliminated the commonly known causes of abortion, but no causative agent could be identified. It is believed that research will eventually reveal an infectious agent causing abortions, as yet undiscovered.

The complement-fixation test for leptospirosis, which we had been using, was discontinued during the year. In its place the less time-consuming agglutination-lysis test for *Leptospira pomona* was adopted. Antigen for this test is currently prepared by the Sacramento Laboratory. During the year three diagnoses of leptospirosis

in cattle were made, two of which were confirmed by demonstrating the organisms histologically.

Clostridium infections, particularly *Clostridium septicum* and *Clostridium perfringens*, appear to be a major problem, particularly in Ventura and Santa Barbara Counties. There were 19 diagnoses of malignant edema, 16 of which were in cattle, and three in swine.

1954 SUMMARY

	Accessions	Specimens
Chickens, turkeys and other birds -----	4,071	16,846
Cattle -----	209	488
Chinchilla -----	158	206
Horses -----	16	20
Rabbits -----	72	151
Sheep -----	11	16
Swine -----	30	40
Other species -----	21	44
Miscellaneous -----	18	221
Water samples -----	200	200
Totals -----	4,808	18,232

SEROLOGICAL TESTS—Agglutination

Brucellosis

Ape -----	1	1
Cattle -----	125	638
Goats -----	14	248
Swine -----	14	191
Totals -----	154	1,078

*Salmonella**Pullorum disease*

Chickens -----	45,555
Turkeys -----	148,143
Other birds -----	2,395

Typhimurium

Turkeys -----	51,433
Total -----	247,526

POULTRY PATHOLOGY LABORATORY

Turlock

The total number of cases handled at the Turlock Laboratory in the year 1954 increased 10 percent over the year 1953. There were 839 turkey cases examined in 1954 in contrast to 1,008 in 1953. The number of chicken cases increased from 2,680 in 1953 to 3,209 in 1954. The total laboratory volume in 1953 was 3,714 cases with 9,296 specimens examined. In 1954 the total was 4,075 cases with 11,013 specimens examined.

The laboratory was originally founded in 1948 for the purpose of giving veterinary service to the poultry industry concentration in the central and northern regions of the San Joaquin Valley. Other branches of the livestock industry are able to obtain veterinary service from veterinarians in private practice who are highly skilled in diagnosis and treatment of the diseases of mammals. Unfortunately, there are not as yet a very large number of veterinarians in private practice who are routinely giving service in the field of diseases of poultry. One factor which plays a part in the development of this situation is the fact that it has only been a few years since specific treatments for poultry diseases have become available. Sulfonamides used in controlling coryza, coccidiosis, fowl cholera and colibacillosis did not become generally available until late 1948. The antibiotics first became available in late 1950, and were first used in treatment of a wide variety of chicken and turkey diseases in 1952. Other products such as coccidiostats, specifics for blackhead, specifics for fowl typhoid, and new vaccines are still appearing on the market.

At the present time, the laboratory has to provide more of a clinical service every year as well as provide regular laboratory diagnostic service. No doubt the future

will see the practicing veterinarian taking over more of the clinical problems of the poultry industry to the mutual benefit of both.

The incidence of major disease problems in both chickens and turkeys has shown some changes over the 1953 year. Eight diseases of chickens account for a little over 50 percent of the diagnoses in this species. In the order of frequency they are: intestinal coccidiosis, cecal coccidiosis, air sac infection, nephritis, visceral lymphomatosis, infectious bronchitis, emaciation, and enteritis. Intestinal and cecal coccidiosis increased in incidence largely because of damp, warm weather during the early spring of the year. Air sac infection has become a problem in some laying flocks and pullet replacement flocks. Formerly, in the territory served by the laboratory, air sac infection was rare in this type of flock but fairly common in fryer flocks. The possibility that egg transmission of the disease may be a factor in the increased incidence in laying stock should be taken into account.

A newly recognized disease of chickens, avian infectious hepatitis, accounts for about 2 percent of the chicken disease diagnoses for the year. This is in spite of the fact that it was first recognized as a disease entity in early October, 1953. This disease was established as due to an infectious agent by the work of Dr. G. N. Lukas of this laboratory. Since the infectious agent may belong to the pleuropneumonia group, cultures and infected birds have been submitted to Dr. H. E. Adler at the University of California Veterinary School at Davis for further investigation.

Seven diseases of turkeys account for a little over half the total number of diagnoses in this species. In the order of frequency they are: coccidiosis, air sac infection, enteritis, paratyphoid, paracolon infections, hexamitiasis, and nephritis.

For the past three years all turkey poults brought to the laboratory for examination have been routinely cultured for bacteria of the paratyphoid-paracolon group. This has been of value in two ways. First, in focusing attention on the importance of these infections, particularly paratyphoid, in increasing mortality from other intestinal conditions when paratyphoid is present at the same time as a complicating factor; and second, it identifies infected poults which may be carriers so that they may be sold as market birds and not kept as future breeding stock. Routine culture of poults and the widespread use of the testing service for *Salmonella typhimurium* has greatly reduced the amount of paratyphoid infection in the area served by this laboratory. In 1952, 20 percent of the turkeys brought to this laboratory were infected with some type of paratyphoid. Of this 20 percent, 32 percent were infected with *S. typhimurium*. In 1953 only 10 percent of the turkeys were infected with paratyphoid. Of this 10 percent, 40 percent were *S. typhimurium*. In the 1954 year only 6 percent of the turkeys were infected with a paratyphoid organism of any type. Of this 6 percent, only 10 percent were *S. typhimurium*. The incidence of *S. typhimurium* in terms of total numbers of turkeys examined has dropped from 6 percent infection in 1952 to 4 percent in 1953 and to only 0.6 percent in 1954.

The paracolon group of bacteria caused more loss in turkey poults this year than did the paratyphoids. Outbreaks of Arizona paracolon infection began in May, 1953, and continued until the end of the hatching season. Losses in infected flocks of poults averaged 10 percent. Treatment with sulfonamides and antibiotics did not alter the course of the disease. A survey of the laboratory records for past years shows a marked variation from year to year in the incidence of paracolon infection. The incidence as a percentage of the total numbers of turkeys examined was as follows: 1.5 percent in 1952, 0.8 percent in 1953, and 6.5 percent in 1954. It would appear that the increased incidence of paracolon infection in 1954 was due to the breeder flocks becoming infected from an outside source, since there was practically no infection in the poults hatched from these same breeder flocks in the early spring. It would seem likely that the infection was introduced by migrating wild birds.

The Arizona paracolon outbreaks caused so much mortality and involved so many breeder flocks that there was considerable concern on the part of the turkey breeders about the possibility of the poults affected at an early age remaining carriers, and transmitting the infection to the next year's crop of poults via the egg. In order to shed further light on this question an experiment was set up, with the cooperation of the Sacramento Laboratory, on two flocks which were to be kept as breeders and had the infection as poults. There were 1,940 birds in flock I, and 1,756 birds in flock II. The loss as poults in these two groups of birds had been 15 percent. The experimental antigen was made from the same strain of Arizona paracolon which had been isolated from these birds at the time of the early outbreak.

Flock I showed no reactors to the blood test. In addition, every tenth bird in this flock was checked by culture of rectal swabs as a check on the test. All culture were negative.

Flock II showed eight reactors to the blood test. This flock was not checked by culture of rectal swabs. An Arizona paracolon organism was isolated from five of the eight blood test reactors. Isolations were made from the gall bladders, liver and spleen pools, small concretions in the mesentery, and in the ovary of one bird. In none of these birds was a paracolon organism found in the intestinal tract.

It appears probable, from the results of this work, that the egg transmission problem and intestinal shedder problem is not a great factor in perpetuating the disease from year to year as it is with paratyphoid infections. It would appear that there is egg transmission of paracolon infection to the extent of creating a severe problem only when the breeder flock picks up the infection as adults.

LIVESTOCK AND POULTRY PATHOLOGY LABORATORY

Petaluma

POULTRY

The past year's activities in laboratory diagnosis in the field of poultry diseases have been similar to 1953 as to the prevalence of the various diseases encountered. Developments of note are the increasing use of drugs, especially the antibiotics, administered either in the feed or water and by individual injection. Field experience of veterinarians in the Sonoma County area as well as experience at this laboratory has proved that larger doses of the drugs than was used in the past are necessary to achieve satisfactory results, particularly in the respiratory dosages of chickens and turkeys. In many cases treatment by individual injection of birds was necessary. Other developments of great value in preventing respiratory diseases are the widespread use of modified live virus vaccination against infectious bronchitis and the development of safe and labor saving new methods of administering Newcastle vaccines, including the dust spray, liquid spray and water administration.

Respiratory infections in poultry flocks in this area are often mixed infections which include chronic respiratory disease. The latter is often combined with or follows infectious bronchitis; and less often Newcastle disease or laryngotracheitis. The common occurrence of such mixed infections obviously makes their complete control very difficult. However, regular vaccination program as well as treatment schedules when needed, based on the individual poultry ranch setups have helped the poultryman to attack his respiratory disease problems in a more rational manner.

While coccidiosis, particularly the intestinal types, remains a problem, its control has been very much simplified by the proper use of coccidiostatic drugs and proper sanitation.

Pullorum disease in chickens has been reduced to the point where only a small number of the breeder flocks remain infected. Some of these, however, continue to be sources of outbreaks in chicks, largely because a few poultrymen remain satisfied with a testing program on the "passed" basis rather than eradication of the infection by thorough persistent testing. The existence of the variant type infection in a few flocks is undoubtedly the primary cause of a lack of complete pullorum eradication. The importation of eggs from out of the State from sources of questionable pullorum status is also a factor in controlling this disease.

It is recommended that breeders in whose flocks pullorum infection and especially pullorum of the variant type exists, institute a thorough testing program to clean up this infection and to virtually eradicate pullorum infection in this area.

In turkeys the principal disease problems during the past year have been paratyphoid, erysipelas, and PPLO (pleuropneumonia like organisms) infection, or infectious sinusitis. Progress has been made toward the elimination of paratyphoid in breeder flocks through flock testing and bacteriological examination of blood test reactors along with careful farm sanitation measures. The field use of an erysipelas bacterin to prevent this disease is proving to be successful. Knowledge of the proper timing and dosages of erysipelas bacterin has been obtained from various field experiments carried on cooperatively by the University and State Diagnostic Laboratory.

LIVESTOCK

The numbers of cattle, sheep and other livestock specimens processed for diagnosis has continued to increase during the past year. One of the principal disease problems facing veterinarians and livestock owners, particularly in cattle, are the abortion infections. These include brucellosis, vibriosis, leptospirosis, vitamin "A" deficiency, miscellaneous bacterial infections such as listeriosis, and a number of apparently

infectious abortions due to unexplained causes. Experience during the past year indicates that a portion of the abortion diseases of unknown etiology may be due to viral agents, including those of the large virus or psittacoid group. Serology and microscopic findings indicate that the latter group are responsible for abortion.

Other well known infections occurring in cattle which have been encountered during the past year, include anthrax and clostridial infections due to *Clostridium septicum*, *chauvei* and *welchi*.

Leptospirosis, due to *L. pomona*, was recognized for the first time this year as a disease problem in both beef and dairy herds of the north coast area. The disease has usually caused concern when unexplained abortions occurred in the herds. A considerable number of herds in the area have been vaccinated against leptospirosis following laboratory diagnosis of the infection. The Sacramento Animal Pathology Laboratory has been of great assistance in detecting the infection in this area through their cooperative running of leptospira serological tests.

Diseases of sheep encountered include enterotoxemia; the common intestinal paritisms; one case of photosensitization, probably due to ingestion of certain toxic plants. *Clostridium septicum* infection has also been encountered in several flocks.

Specimens for rabies examination received by the laboratory have been forwarded to the State Public Health Laboratory at Berkeley, for diagnosis. Positive cases of rabies have been encountered in cattle, sheep, and equine, and numerous foxes and skunks.

The handling of rabies suspect material at this laboratory has enabled us to assist in differential diagnosis of certain diseases simulating rabies, including listeriosis and bovine encephalomyelitis. The virus of bovine encephalomyelitis has been recovered for the first time in our area and has been propagated in laboratory test animals and chick embryos. Infectious material has also been transmitted to the university for further study.

Two new disease conditions have been encountered in cattle and in sheep. One was a nonbacterial infection of cattle, most marked in calves of one day to one week of age, manifested by severe enteritis and diarrhea, and in some cases by nervous disturbances. This form of enteritis has been encountered by practicing veterinarians in dairy herds in this area for several years, causing high economic losses. It has not responded to any of the known methods of drug or biological treatment. Cases of this baby calf enteritis, brought to our attention for diagnosis late in the year, are being studied intensively with a view to isolating the etiological agent and making a diagnosis so that adequate control measures can be instituted.

The second was a sporadic type of viral infection of sheep flocks in the area. The primary etiological agent of this infection now being intensively studied, appears to be a large virus of the psittacosis-lymphogranuloma group. An interesting observation in connection with this viral infection is that it seems to be associated with certain bacterial infections, particularly such clostridial infections as *Clostridium septicum*. Experience indicates that the bacterial infections are secondary and occur in terminal cases of the viral infection. In affected animals bacterial pathogens are isolated irregularly while the virus appears to have invaded the blood stream and most of the principal organs of the body prior to death of many animals examined.

LIVESTOCK AND POULTRY PATHOLOGY LABORATORY

Fresno

POULTRY

The volume of poultry cases submitted to the Fresno Laboratory in 1954 was essentially the same as the previous year. There were 2,164 cases submitted and a total of 7,143 specimens were examined.

From these cases certain respiratory diseases still continue to be the leading factor of poultry disease problems. Chronic respiratory disease associated with infectious bronchitis or other conditions is at the present time the most costly and prevalent of all. With the introduction of commercial infectious bronchitis vaccines this year, it is hoped that by controlling the time when bronchitis virus is administered to various flocks the incidence of chronic respiratory disease will be diminished. At the present time various methods of vaccination with bronchitis and Newcastle disease viruses are being tried. It is hoped that the introduction of infectious

bronchitis virus at 10 to 14 days of age, along with the use of high level of antibiotics at this time will reduce the incidence of chronic respiratory disease in a given flock. In the past years the highest mortality from chronic respiratory disease has been encountered during the last few weeks of the growing period of fryers.

The incidence of laryngotracheitis and Newcastle disease is worthy to note in the area served by the Fresno laboratory. Newcastle disease was diagnosed 12 times and laryngotracheitis three from a total of 322 respiratory diagnoses.

The diagnosis of coccidiosis remains high in spite of the predominate use of coccidiostats. Part of this fact may be brought about inasmuch as sanitary measures are greatly neglected and the efficiency of the drugs are relied upon to entirely control this disease.

Hemorrhagic disease was diagnosed 35 times during the year of 1954. These are probably the first diagnoses recognized as this disease entity in this area where the problem has been widespread and serious from an economical standpoint.

The diagnosis of turkey diseases are led by intestinal disorders. Since the advent of antibiotics, mortality from these intestinal upsets, such as nonspecific enteritis, have been greatly reduced.

There were approximately 14,000 less turkeys tested during the year of 1954 for pullorum disease. A total of 246,136 pullorum tests were performed and 52,402 *Salmonella typhimurium* tests, which is a reduction of 11,300 tests.

No chickens were tested by the tube methods for pullorum disease at the Fresno laboratory during the year 1954.

LARGE ANIMALS

There was approximately a 14 percent increase in the number of large animal cases submitted to the laboratory over the previous year. A total of 1,160 cases were submitted and 3,818 specimens examined.

In reviewing the various diseases diagnosed in large animals, there does not seem to be any predominate individual disease except possibly the syndrome of bovine abortions. In relation to this abortion problem *Brucella abortus* was isolated five times. Leptospirosis was diagnosed other than by serological methods seven times. vibriosis was diagnosed one time and vitamin "A" deficiency associated with abortions 12 times. During the year *Salmonella dublin* was diagnosed eight times, but never associated with abortion as is reported in other countries.

Another problem which this laboratory encounters is the diagnosis of diarrhea both in calves and adult animals. The majority of this problem is associated with parasitism, but an interesting case was encountered with practically 100 percent morbidity with diarrhea and drop in milk production on a dairy ranch. In this case the problem was attributed to *Salmonella typhimurium*. (See report attached.)

LIVESTOCK AND POULTRY PATHOLOGY LABORATORY

Sacramento

The results of laboratory examinations in successive years tends to bring more sharply into focus the animal disease problems which require further research to identify etiological agents. The number of cases ultimately diagnosed as known disease entities do not, with few exceptions, vary greatly from year to year. A few entities observed during 1954, which require further study, are described as follows:

CATTLE

Abortion

The abortion problem has continued unabated. There was a marked increase in the number of fetuses submitted for examination in 1954 and a similar increase was noted by the receipt of other specimens relating to abortion problems. Specimens from 122 herds where abortions had occurred were submitted. These are described in three groups, namely: Group 1, Fetuses; Group 2, Serums all of which were tested with Vibrio antigen and some of which were also tested with Leptospira and Brucellosis antigen; and Group 3, Serums tested with Brucellosis and Leptospira antigen.

Group 1, Fetuses. Fetuses were submitted from 44 ranches and only five yielded organisms which were considered responsible for the abortions. Three brucella and one vibrio isolations were made and corynebacterium was recovered from one fetus.

Group 2, Serums. Of the 19 herds tested, 10 were positive for brucellosis and three had diagnostic titers for *Leptospira pomona*. Two of the three herds were positive with both Leptospira and brucellosis antigens.

Group 3, Serums. Serums from aborting animals in 59 herds were tested for vibrio and four were found to have diagnostic titers when tested with vibrio antigen. Forty-eight herds of this group were tested with brucellosis antigen and 14 were positive. Some animals of 27 herds were tested with leptospira antigen and seven were positive. In 45 of the 122 herds tested, laboratory studies indicated that either vibrio, leptospira or brucellosis organisms had been present in the herds.

Vibrio

In an attempt to evaluate the significance of vibriosis in relation to the abortion problem, several strains of *vibrio fetus* were tested to evaluate their suitability as antigens. Only one of the strains was found to be satisfactory. Serums from a number of animals in 83 herds, where abortions had occurred, were tested for vibrio antibodies. From the sampling of 83 herds only six were found with animals having diagnostic titers for vibriosis. Only one isolation of *vibrio fetus* was made following the examination of aborted fetuses from 44 herds. Agglutination the vaginal mucus tests were also conducted on 5 of the 83 herds. Positive agglutination reactions were noted in three of the five herds, but attempts to isolate *vibrio fetus* from these five herds were negative. It is acknowledged that in attempting to evaluate findings in relation to vibriosis that the antigen used is undoubtedly not sufficiently wide in its antigen pattern to detect all animals having titers as a result of vibrio infection. It does seem justifiable, however, to propose that because vibrio was isolated only on one occasion following the examination of fetuses from 44 herds and because of the relatively few animals showing titers, that vibriosis is not responsible for other than a small percentage of the abortion cases. It would appear, however, that there is a need for continued study of strains of *vibrio fetus* as prelude development of a more suitable antigen.

The results clearly indicate the need for more extensive diagnostic procedures on each herd and for the application of a more extensive pattern of diagnostic methods in those cases where answers are not forthcoming following the application of routine measures.

Trypanosome

Trypanosomes were found in blood serums from one herd of Hereford cattle. The serums were examined incident to studies in animals of this herd because of an abortion problem. Only a few adult animals were lost and although no other pathogens were identified, sufficient data was lacking to support the proposal that Trypanosomes were responsible for the loss.

The organism was submitted to the Agricultural Research Service, Washington, D.C., for identification and although organisms were further confirmed as Trypanosomes, a species determination was not made.

Serums from other animals in the herd were submitted to the Agricultural Research Service for complement fixation tests. The results were negative.

Hemoglobinuria

Losses in cattle exhibiting symptoms of hemoglobinuria and a thermal response have been noted throughout the herd, but the exact cause has not been identified. Leptospira and known members of the Clostridia group have been eliminated from consideration as causative agents.

Other Infections

Three of the commonly found disease entities of cattle, anaplasmosis, anthrax and parasitism, were encountered at about the same rate of frequency as in previous years. Anthrax cases dropped from nine to three, anaplasmosis increased from 12 to 13, and an identification of endo parasites increased from 76 to 93.

SHEEP

The laboratory was requested to conduct studies in relation to testicle infection of rams. The lesions consisted of large abscesses, some of which failed to yield bacteriological agents. From others, however, a member of the Corynebacterium group was recovered in pure culture. An attempt to reproduce the lesions following artificial inoculation into experimental animals was unsuccessful. Despite the negative transmission results, it would appear that the organism was responsible, either as a primary or secondary agent for the pathology observed.

One band of ewes in Northern California suffered extensive losses from abortion. The initial specimen received following difficulty in this band failed to yield evidence of an infectious agent. The specimens were submitted at the laboratory in a frozen condition. Subsequently, other specimens (fresh) were examined and *Vibrio fetus* was recovered. This experience emphasizes the need, when possible, to submit fresh specimens to avoid methods of preservation which will destroy or limit the number of viable bacteria in the specimens.

POULTRY

The Sacramento Laboratory received a total of 1,672 poultry cases (accessions) in 1954. This was a substantial increase over the previous year's total and exceeded the total for 1949 by 80 percent.

Chickens

The 495 outbreaks of coccidiosis in chickens encountered in the past year, compared to 293 outbreaks reported in the previous year, constituted an increase of 69 percent. Curiously, with this rise in incidence was an accompanying jump in the number of toxicity cases directly involving coccidiostatic drugs. In 1954, there were 40 cases of sulfa poisoning and two cases of nitrophenide toxicity. In contrast, only two cases of sulfa poisoning were reported in the previous year. The following mishandlings were uncovered in these cases of sulfa toxicity:

1. The 0.04 percent concentration of sulfaquinopoline in the drinking water was administered for too prolonged a period.
2. The marked increase in water consumption encountered in last summer's heat waves, was not taken into consideration insofar as regulating the dosage to avoid over-medication.
3. The dosage recommendations made by one local commercial firm was determined to be excessively high.
4. The jug containing the drug solution had been carelessly left in a sunny spot with a loose cap, allowing for evaporation of the water and consequent concentration of the drug solution.
5. Automatic drug dispensers connected to some watering systems proved to be faulty on inspection.

In one case of nitrophenide toxicity, the feed was found to contain a toxic level of this drug, as determined by quantitative chemical analysis, however, in the other case, the drug percentage in the feed proved correct but a sudden lack of water, due to switching of watering devices, apparently produced a cumulative drug effect.

The significant rise in incidence of coccidiosis points out the urgent need for a re-evaluation of present day concepts of coccidial control. It seems apparent that undue reliance has been placed on drugs to accomplish the job—practically single-handedly. The other important factors in coccidial control, namely, prompt segregation of the visibly sick birds and effective litter management, were obviously ignored in too many instances. The introduction of the coccidial vaccines in this area has been so recent that no evaluations could be made.

There was a moderate increase in the number of cases designated as air sac disease, or "chronic respiratory disease," in the past year over the previous year. Because drug therapy, in general, for this complex disease entity has very definite limitations and because the cost of medication is often prohibitive, prophylaxis has been emphasized in consultations. Toward this end, much effort has been expended in considerations of "stress factors" regarded as significant in the pathogenesis of this disease complex. To minimize this predisposition, emphasis has been placed on coccidial control and correct vaccination programs.

Twenty-two avian encephalomyelitis outbreaks were recorded, compared to three cases in 1953. In each of these outbreaks, the morbidity was relatively low, usually under 5 percent, and the disease course in a brood generally lasted only a few weeks.

There were 30 outbreaks of staphylococcal arthritis, or synovitis, and 10 outbreaks of histomoniasis ("blackhead") in the past year in chickens. These figures represent significant increases over the previous year's totals.

It is considered feasible that the same conditions that permitted the rise in coccidiosis incidence may have influenced the incidence rate of these diseases.

There was a marked decrease in the incidence of Newcastle disease in the past year. Fifteen outbreaks were recorded as against 73 outbreaks in 1953. The following factors were considered as influential in this drop in incidence:

1. Adoption of routine vaccination practices in outlying areas.
2. Better understanding of the various types of Newcastle vaccines available on the market.

Turkeys

Several changes in the disease incidence picture of turkeys were notable.

The incidences of histomoniasis ("blackhead") and hexamitiosis dropped moderately in the past year, compared to the previous year. Perhaps the introduction of certain new drugs, such as furazolidone, has influenced this downward trend.

A significant drop in the incidence of erysipelas disease may be attributable, at least in part, to the more widespread employment of the killed vaccine in breeder flocks in this area.

Five outbreaks of Newcastle disease in turkeys were encountered. Only two outbreaks were recorded in 1953. This low incidence is surprising inasmuch as very few breeding flocks in this area are routinely vaccinated for Newcastle disease. An outbreak did occur in adult turkeys in Placer County and if this trend continues, routine vaccination of breeders in this area may be forthcoming.

Pasteurella psuedo-tuberculosis was recovered from the tissues of turkey poults submitted from the foothill area east of Sacramento. This organism is very infrequently encountered in turkeys.

The *Salmonella typhimurium* detection service was operated in a manner similar to that of previous years. A total of 125,252 turkey sera were tested with typhimurium antigen, representing 61.4 percent of the total number of turkeys tested for pullorum disease.

Four flocks were detected as having typhimurium carriers as a result of the agglutination tests and postmortem examinations. One of the infected flocks had apparently picked up the infection as adults; while two of the infected flocks had been brooded and hatched with poults of unknown status from the standpoint of typhimurium carriers. The fourth flock were progeny of breeders which were infected the previous year and the necessary steps had not been taken to assure freedom from infection in the breeders.

That the testing service is effective in minimizing infection is evident in that infection in the poults was traced to only four breeder flocks which had been tested. Of the four flocks, only one poult outbreak was reported and no data are available to explain the source of the outbreak. Progeny from two of the flocks from which infection had been reported were hatched and brooded with birds of unknown status. Progeny from the fourth flock which had been tested and which had suffered an outbreak were from breeders which had been tested, found to be infected, but kept as breeders without having two negative tests.

In compliance with a request from the Turlock Laboratory, a survey of the paracolon problem in California was made and an evaluation of possible control measures was made. An experimental antigen was prepared and used on several thousand sera from breeders having had a history of infection. In addition, the cooperation of the U. S. Public Health Service Laboratory in Chamblee, Georgia, was obtained to assist in identifying types of Arizona paracolons recovered from turkey breeders in California.

Although the laboratory's activities are not necessarily measured by the number of cases that are presented as accessions, it is noted that in 1954 the large animal accessions exceeded by 17.8 percent and the poultry accessions by 23.7 percent those received in 1953.

The character of the cases submitted, particularly large animals, rather than the number of cases influences the amount of work which may be done on a given case. The abortion specimens in cattle offer an example of cases which may prompt rather extensive work on a single case because of the need to eliminate a number of factors which may have accounted for the abortion. The work on vibrio, for example, was largely an outgrowth of the abortion investigation because of the failure to establish the etiological factor.

BUREAU OF DAIRY SERVICE

O. A. GHIGGOILE, *Chief*

Enforcement of the provisions of chapters one to ten inclusive, division four, of the Agricultural Code of California, and rules and regulations promulgated thereunder, is the direct responsibility of the Bureau of Dairy Service. To carry out effectively such code provisions, two positions within the bureau were reclassified as area supervisors, placing one area supervisor in Northern California and one in Southern California. An outline of the various functional divisions of bureau work follows.

MARKET MILK PROGRAM

At the beginning of 1954 there were 50 cities and counties maintaining milk inspection services by virtue of Department of Agriculture approval; however, there were only 48 at the close of the year, since the cities of Richmond and Ontario voluntarily surrendered their certificates.

It is the responsibility of this department to supervise approved milk inspection services, which involved 573 surveys and investigations during the year. Inspection of dairy farms and distributors of market milk, in areas where approved milk inspection services are not maintained, is under the direct supervision of the department. Legal authorization allows the Director of Agriculture to establish graded milk inspection areas where the facilities of approved milk inspection services are not available. Such inspection is now being rendered in 21 counties.

Because of insufficient personnel and laboratory equipment at Sacramento, the Bureau must contract with outside laboratories for required bacteriological and chemical determinations on market milk samples. Five laboratories have been under contract, and during 1954 these laboratories conducted 15,327 bacteriological and chemical determinations on 7,298 samples of market milk and cream. In addition to the samples submitted to these laboratories, there were 10,089 samples collected for analysis and forwarded to the Sacramento laboratory and 22,034 labels for market milk examined for accuracy. As an adjunct of laboratory analysis, certain field tests were made to determine quality and composition of the products. These tests consisted of 585 lactometer readings, 7,138 flavor and odor tests, 8,950 sediment tests, 6,463 temperature tests and 115 phosphatase tests. These tests were conducted during the 7,387 inspections and visits of market milk dairies.

It is the responsibility of the Bureau to examine licensees and supervise technicians doing bacteriological examinations of milk and cream purchased on the basis of bacteria count. At the close of 1954 there were 91 licensed technicians; 35 investigations were made of the accuracy of their work.

Employees working in laboratories maintained by approved milk inspection services must qualify by an examination which is relevant to chemical and bacteriological examinations of milk and cream. Successful applicants are issued certificates of proficiency in market milk analysis. Twenty-two such certificates were issued during 1954; a total of 560 certificates have been issued since 1929. There were 92 checks and examinations made on holders of such certificates and 516 investigations of laboratory equipment.

In accordance with Agricultural Code provisions, dairy inspector refresher courses were held throughout California. The purpose of these refresher courses is to standardize procedures, policies and uniformity in dairy farm and milk plant inspection.

RECEIVING POINT INSPECTION

Quality determinations on milk and cream produced for manufacturing purposes are made of such products when they are received at a milk product plant. Quality determinations are made on manufactured milk by the use of direct microscopic count, sediment tests, temperature and odor tests; on manufacturing cream they are made by the modified volumetric acidity tests, sediment tests and flavor and odor tests.

There were 1,201,137 lots of milk and cream upon which quality determinations were made; this includes 144,816 microscopic examinations, 478,317 temperature tests, 668,086 flavor and odor tests, 497,742 sediment tests and 2,533 acidity tests.

This work is made possible through voluntary agreements between dairy product processors and the department. Twenty-five dairy inspectors are supported by this program. A total of 2,911 visits were made to milk products plants for quality determinations on milk and cream, and 49,270 inspections and visits were made to dairy farms.

During the course of dairy farm inspections, the sale of milk and cream from 65 dairies was suspended until the facilities were restored to a sanitary condition. As a result of quality determinations on the products, there were 24,218 lots of milk, representing 1,524,905 pounds, and 35 lots of cream, representing 1,158 pounds, condemned as unfit for human consumption.

FROZEN MILK PRODUCTS PROGRAM

During 1954 there were 1,333 firms licensed to manufacture frozen milk products, namely ice cream, ice milk and sherbet. Samples of frozen milk products for laboratory analysis are checked at point of manufacture, distribution, and retail. All samples are forwarded to the dairy laboratory in Sacramento for chemical analysis and bacteriological determinations, with specific reference to bacteria, milk fat, stabilizers and food solids. A total of 7,876 samples were collected for analysis and 5,311 lots of frozen milk products examined for quality. Considerable time is spent on the advertising and labeling of these products, as indicated by the 18,344 investigations made during 1954. To determine the amount of food solid contained in ice cream and ice milk it is necessary for our field staff to make accurate weight determinations at the time the product is sampled. During the year weight tests were made on 3,958 units of ice cream and ice milk. The manufacturers of ice cream or ice milk are required to obtain a special permit for the use of butter, eggs or egg products. Such permits were issued for 12 manufacturers of frozen milk products during 1954.

BUTTER CONTROL PROGRAM

All persons in charge of cutting, wrapping, packaging, or distributing butter, or supervisors thereof, must obtain a butter grader's license. At the close of the year there were 88 licensed butter graders upon whom 468 checks or examinations were made to test accuracy of their work. The control of composition and labeling of butter is based largely on quality determinations and the result of laboratory analysis. During the year 7,287 samples of butter were scored and examined for quality and 372 samples collected for laboratory analysis; there were also 1,335 lots of butter investigated for correctness of weight and 7,865 butter brands and labels examined.

The amount of butter impounded for failure to meet quality determinations was 10,361 pounds; this compares with 31,315 pounds during 1953. The total amount of butter cut and wrapped in California was approximately 94,000,000 pounds. The authority of the department to impound and retain butter found incorrectly labeled with quality determinations until rewrapped in proper packages was challenged during 1954. A lower court, however, decided in favor of the department, a decision later affirmed by the appellate court.

CHEESE CONTROL PROGRAM

All varieties of cheese sold in California, except those defined by the Agricultural Code, are classified as special varieties. They may be sold only after standards of composition and labeling requirements are established by the director, subsequent to a public hearing.

During the year temporary definitions and standards were added for uncreamed cottage cheese, with added chives, fruits and vegetables.

There were 680 samples of cheese products collected for laboratory analysis and 17,405 labels and brands examined for accuracy. Quality examinations were made on 1,049 lots of cheese, resulting in the impounding of 5,685 pounds because of failure to meet standards of composition or because of improper labels.

GENERAL PRODUCTS INSPECTIONS

Products included in this group are concentrated milk, evaporated milk, condensed milk, both whole and skimmed, powdered whole or skim milk, acidophilus milk, modified milk, buttermilk, cultured buttermilk, nonfat milk, sterilized milk and cream, milk fat, cream dressing, whipped cream topping, eggnog, and certain other milk drinks. Samples of these products together with certain ingredients entering into their manufacture are collected for laboratory analysis. A total of 2,023 samples were

collected and 7,839 lots examined for quality and labeling. Thirty-six lots were rejected for failure to meet certain requirements.

IMITATION LICENSING SERVICE

Imitation milk products sold in California include oleomargarine, imitation milk, imitation cream, imitation ice cream, imitation ice milk, imitation whipped cream topping, and powdered imitation milk primarily used for feeding of infants and largely upon a prescription of a physician. There were 1,568 investigations made concerning imitation milk products. At the end of the fiscal year, June 30, 1954, licenses were issued to nine manufacturers of oleomargarine, 184 to wholesale dealers, 1,816 to bakers and restaurateurs, three to manufacturers of imitation milk, 13 to wholesale dealers, 233 to retailers, eight to bakers and restaurateurs, two to manufacturers of imitation cream, two to wholesale dealers, 30 to retailers, 75 to bakers and restaurateurs, 10 to manufacturers of imitation ice cream or imitation ice milk, 89 to wholesale dealers and 1,740 to retailers.

The case commonly known as *Market Basket versus Department of Agriculture* resulted in a temporary injunction granted the plaintiff; however, a notice of appeal has been granted.

Another case involving an imitation milk product was brought against the department by Midget Products Company, Los Angeles, manufacturers and distributors of a whip cream topping containing vegetable fats and solids other than milk solids. This firm was granted a permanent injunction but a notice on appeal was filed by the department.

COMMERCIAL TESTING SERVICE

All persons testing, sampling and weighing milk or cream where the tests or weights are used for determining payment of products, must be examined and licensed by the department. At the close of 1954 there were 819 licensed milk and cream testers and 1,897 licensed samplers and weighers. The work of all active licensed testers is checked at irregular but frequent intervals for accuracy. There were 359 checks or examinations conducted on milk and cream testers and 2,482 on samplers and weighers. While checking these licenses, 8,466 samples of milk and cream were collected for testing and 44,772 pieces of testing apparatus examined for accuracy, of which 557 pieces were condemned as being inaccurate.

During the year 2,019 bulk farm tanks were checked and tested. Tests and weight records at milk products plants are checked frequently to see that correct tests and weights were given producers of milk and cream. During the year the records were checked at 474 milk products plants and 293 investigations were made on the sampling of milk and cream.

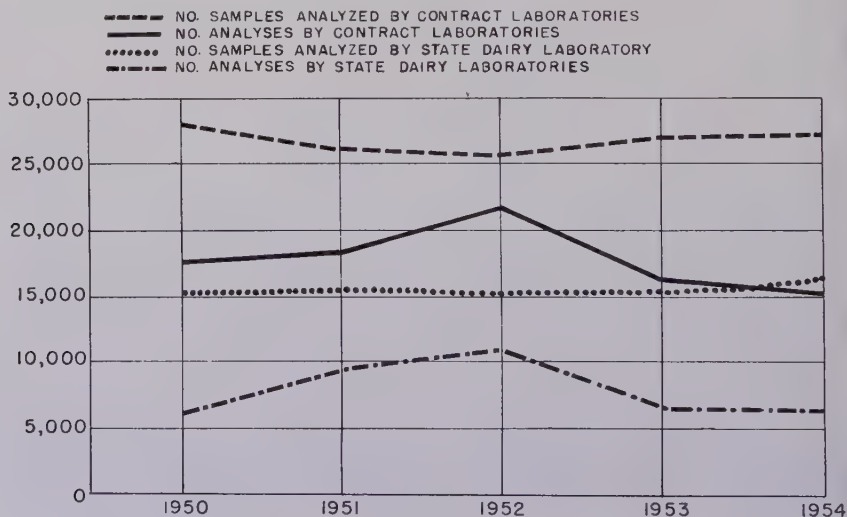


CHART No. I

DAIRY CONTAINERS SERVICE

It is permissible under the Agricultural Code for persons who deal in milk or milk products or are otherwise connected with the dairy industry to register dairy container brands with the department. During the year 33 dairy container brands were registered, and at the close of 1954 there were 839 active certificates of dairy container registrations.

Enforcement of those provisions of the Agricultural Code relating to containers marked with the registered brand and users thereof, must necessarily be on a self-cooperating voluntary basis. There are four such voluntary projects in existence covering the Southern California area, the San Francisco Bay area, and the Sacramento-San Joaquin Valleys. Three investigators employed on these projects during 1954 made 12,486 visits to various establishments to check containers; the investigators were instrumental in returning 18,131 containers to rightful owners. They also checked brands and conditions of 447,064 containers; because of faulty conditions 439 were condemned. Bottle exchanges are organized and established throughout California to facilitate the prompt return and shipment of containers from one state area to another. There were 330 investigations made on dairy container exchange operations. Members of our staff associated with the manufacturing milk and cream quality control program are in a position to render service to the industry in recovering milk cans. As a result of this activity 4,341 milk cans were returned to the proper owners. There were 737,142 milk cans examined for defects of which 6,106 were found defective and therefore condemned.

All dairy containers must be properly washed and sterilized; a process which is usually done by mechanical devices. During the year 4,363 inspections were made on such devices.

Since dairy products are perishable, containers must be transported in vehicles maintained in a sanitary and clean condition at all times. This accounted for 35,440 inspections of transportation facilities.

DAIRY SERVICE LABORATORY

The Dairy Service Laboratory is concerned with certain laboratory examinations on milk and milk products to determine if such products conform to legal standards.

During the year, 16,397 samples of milk and milk products, upon which there were made 13,168 chemical and 14,011 bacteriological determinations, were tested at the laboratory. The flow of samples in the laboratory is fairly constant, year after year. The case of samples analyzed at the laboratory under contract with the State, mentioned previously under "Market Milk Program," fluctuates. This can be seen by referring to Chart No. 1.

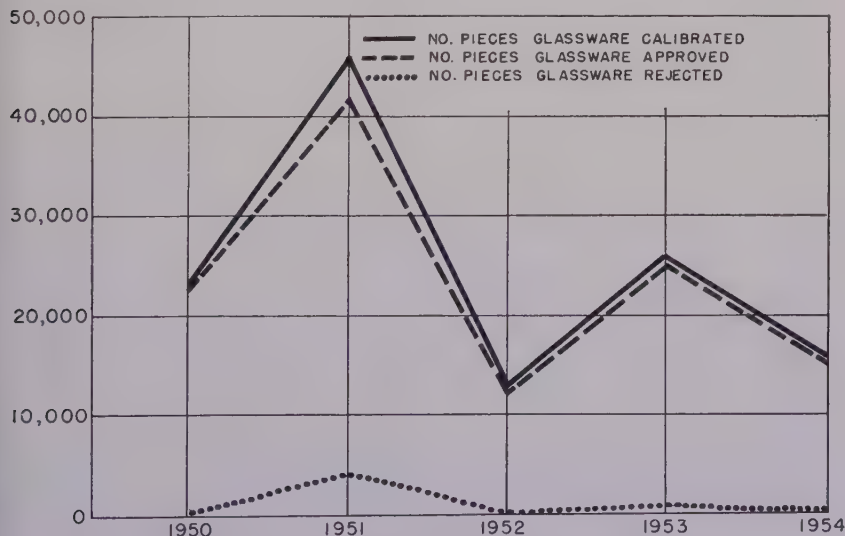


CHART No. II

All glassware used in connection with various methods for testing milk and cream must be checked for accuracy in the laboratory, before such glassware can be used in California. There were 15,177 pieces of such testing glassware examined during the year, of which 15,032 pieces were approved and 145 rejected. Chart No. 2 shows number of pieces of glassware tested, accepted and rejected for the past five years.

GENERAL

Since many activities of the bureau are general in character, they cannot be included with any one of the bureau's specific functions. For example, there were 4,656 visits made to retail establishments to check labeling and quality of milk products and 14,815 inspections and visits made to milk product plants. At these plants 3,738 thermometers were checked for accuracy and 44,862 thermometer charts examined to assure all required information was shown. There were 1,332 applicants for pasteurizers licenses examined or checked during 1954. At the end of the year there was a total of 2,227 licenses issued to operators of pasteurizing equipment. During the year 237 H.T.S.T. units were checked and sealed.

In the building program, there was a total of 1,137 new milk product plants and dairy farm buildings constructed and 1,661 buildings improved. Improvements secured in equipment amounted to 8,191, and 15,518 improvements were obtained in methods. A total of 1,420 chemical tests were made on washing and sterilizing solutions, 143 sterility tests made on equipment and 1,953 on water supplies.

Members of the bureau continued to assist with instructions conducted by the Dairy Industry Division as well as other divisions of the University of California at Davis, members also assisted with the judging of milk and milk products entries at the California State Fair and various district and county fairs. The bureau again supervised operation of the model dairy barn at the State Fair Grounds. During the year a new film, "The Dairy Story," relating to the dairy industry was made and subsequently shown in many schools and service clubs throughout California.

BUREAU OF MEAT INSPECTION

By DR. GEOFFREY A. BOYD, *Chief*

CALIFORNIA MEAT INSPECTION—1954

This bureau conducts inspection of animals and meat products in slaughtering and meat processing establishments under the provisions of Sections 301 to 320.5 of the Agricultural Code for the purpose of protecting the public from unwholesome or otherwise objectional meat products. The bureau also inspects foreign cold storage meat under the provisions of Sections 321 to 325 of the Agricultural Code and enforces laws prohibiting the sale of uninspected meat in the State.

Continuous population growth in California contributes to an ever-increasing demand for meats to supply consumer needs. To insure the wholesomeness of this supply, the meat inspection service of the department necessarily must extend its facilities for inspection, and to help meet this great demand, there were 336 meat slaughtering and processing establishments operating under state inspection at the close of the year, 74 of which were engaged in slaughtering. This total represents an over-all gain of 20 plants over 1953. In addition 89 establishments operated under state approved inspection conducted by four municipalities.

1,349,663 head of livestock were slaughtered under state meat inspection, an increase of 52,942 animals or 4 percent over the 1953 slaughter. The largest increase was in calf slaughter, 33,655 above 1953; swine slaughter showed a decrease of 18,886 under the previous year.

Over the past 10-year period the total number of animals slaughtered under state inspection has shown a continuous increase. The number of animals slaughtered in 1954 was 60.8 percent more than were slaughtered 10 years ago.

ANIMALS SLAUGHTERED IN CALIFORNIA UNDER FEDERAL, STATE AND STATE APPROVED MUNICIPAL MEAT INSPECTION—PERIOD 1945-1954

Year	Cattle	Calves	Sheep	Swine	Total
State					
1945	143,923	186,995	183,506	89,157	603,581
1946	286,987	245,356	280,970	146,294	959,607
1947	294,323	249,839	264,138	129,959	936,259
1948	265,653	197,830	304,475	179,538	947,496
1949	278,666	196,411	211,713	243,976	930,766
1950	283,460	164,669	165,387	233,213	846,729
1951	282,531	121,593	190,606	271,582	866,312
1952	316,337	169,434	266,800	298,577	1,051,148
1953	417,095	254,951	378,698	243,434	1,294,178
1954	434,447	288,606	399,623	224,548	1,347,224
State approved					
1945	32,647	20,360	215,515	35,393	303,915
1946	46,911	18,556	186,561	41,503	293,531
1947	31,577	13,070	139,270	22,960	206,877
1948	12,361	2,606	142,452	22,099	179,518
1949	14,038	2,397	122,196	24,285	162,916
1950	12,554	2,576	95,192	26,039	136,361
1951	11,418	707	37,632	12,830	62,587
Federal					
1945	1,482,026	389,862	2,695,647	1,246,770	5,814,305
1946	1,451,784	385,554	2,780,942	1,440,055	6,058,335
1947	1,360,461	475,302	1,804,535	1,499,262	5,139,560
1948	1,170,308	417,016	1,716,519	1,528,140	4,831,983
1949	1,238,535	381,567	1,543,367	1,694,819	4,858,288
1950	1,186,321	296,053	1,475,705	1,802,025	4,760,104
1951	1,360,848	243,823	1,442,050	2,052,351	5,099,072
1952	1,498,846	251,992	1,602,458	2,058,669	5,411,965
1953	1,814,762	363,924	1,710,659	1,623,109	5,512,454
1954	1,858,745	390,274	1,774,860	1,613,446	5,637,325

Grand total—animals slaughtered under Federal and State inspection during 1954.....6,984,549

PROCESSING

Processing plants operated under state inspection manufactured 145,339,997 pounds of meat food products, an increase of 8,748,988 pounds or 6 percent over 1953. The 89 establishments operating under approved municipal inspection manufactured 45,513,313 pounds of meat food products, a slight decrease under the previous year.

LABELS

During 1954, 3,547 labels and sketches were reviewed, 88 of which failed to meet rigid regulatory requirements and were not approved. Many label sketches were approved conditionally with the understanding that certain corrections must be made on the finished label.

FOREIGN COLD STORAGE MEAT

A total of 175,446 pounds of foreign cold storage meat was imported into California during the year. This is an increase of 131,671 pounds over the previous year. This meat, consisting of beef, veal, mutton, and lamb from New Zealand, required 36 hours for inspection; \$106.12 inspection fees were collected. There were no condemnations of these meats made.

Licenses issued for handling foreign cold storage meat and license fees collected were as follows:

<i>Type license</i>	<i>Number</i>	<i>Fee</i>	<i>Total</i>
Wholesalers -----	4	\$25	\$100
Retailers -----	1	10	10
Importers -----	2	25	50
Restaurants -----	1	5	5
Totals -----	8	\$65	\$165

CONSTRUCTION

Forty-one plans for establishment construction were approved during the period. These projects included entirely new buildings, both slaughtering and processing



Frankfurters in process of passing through automatic linking machines.



Chopping and emulsifying ingredients for sausage.

plants, and the remodeling of existing structures. For the most part this construction has been completed with the improved sanitation incident to best plant facilities.

VIOLATIONS

Investigation of alleged violation of the meat inspection provisions of the Agricultural Code resulted in five convictions. There were \$275 collected in fines, \$525 in fines suspended and three years probation meted out by the courts. One hundred and ten pounds of meat involved in these cases were condemned.

MEAT INSPECTION LABORATORY

During the year, 1,140 samples of various meat food products and other materials were examined in the meat inspection laboratory for adulteration, contamination, artificial coloring, preservatives, etc. The tabulated results of these examinations follows:

<i>Product or material</i>	<i>Passed</i>	<i>Not passed</i>	<i>Not * classified</i>	<i>Total</i>
Meat and meat products.....	667	170	6	843
Edible oils and fats.....	8	—	—	8
Curing materials.....	108	15	—	123
Cereals, spices, condiments.....	104	8	—	112
Ink, ink ingredients.....	3	—	—	3
Miscellaneous	44	7	—	51
Totals	934	200	6	1,140

* Refers to samples received in condition not suitable for proper analysis.

NUMBER OF ANIMALS CONDEMNED FOR VARIOUS DISEASES—STATE INSPECTION—1954

Disease	Cattle		Calves		Sheep		Swine		Goats		Total	
	Car.	Lbs.	Car.	Lbs.	Car.	Lbs.	Car.	Lbs.	Car.	Lbs.	Car.	Lbs.
Actinomyrosis.....	7	2,763	1	150							8	2,913
Anaplasmosis.....	11	4,772	36	1,366							12	4,772
Arthritis and other bone diseases.....	17	8,065	22	1,600	81	3,618	43	5,149			163	18,432
Asphyxia.....			1	40	16	900	3	474			20	1,314
Carditis.....	211	94,899	6	635	5	244	3	419			225	96,197
Caseous lymphadenitis.....					827	35,713					827	35,713
Coccidiod granuloma.....	1	672									1	672
Contamination.....			1	120							1	120
Cysticercosis.....	1	740			10	439	5	962			16	2,141
Cystitis.....	2	850	2	115							4	965
Dropsical diseases.....	15	6,598	3	468	9	379	7	909			34	8,354
Emaciation.....	67	24,476	190	6,629	643	34,541	5	356	4	101	909	66,103
Erysipelas.....							4	604			4	604
Hepatitis.....	5	1,795					1	136			6	1,931
Hog Cholera.....							7	759			7	759
Icterus.....	4	1,790	41	2,308	69	3,051	104	14,102			218	21,251
Immaturity.....			1,700	58,253	12	544	5	953	1	10	1,701	58,263
Injuries.....	18	8,242	13	1,088			1	175			48	10,827
Leukemia.....	4	2,504	3	357							8	3,036
Listeriosis.....	2	1,675									2	1,675
Melanosis.....			3	375			1	140			4	515
Metritis.....	50	24,332			17	866	4	630			71	25,828
Miscellaneous.....	3	1,100			3	130					6	1,230
Nephritis.....	29	12,815	13	860	1	40	9	1,627			52	15,342
Onchophlebitis.....			41	1,889							41	1,889
Parasitic disease.....											1	40
Pneumonia, Pleurisy, Enteritis, Peritonitis, etc.....	268	133,293	228	27,153	441	20,402	212	27,211			1,149	197,699
Pregnancy and recent parturition.....	12	6,141									12	6,141
Sarcoepidiosis.....	11	5,508									11	5,508
Septicemia and Pyemia.....	457	197,023	49	6,118	256	11,833	119	16,473	1	45	882	231,492
Sexual odor.....	2	1,000					32	4,885			34	5,885
Toxemia.....	5	2,250	4	200							9	2,450
Tuberculosis.....	27	13,168					20	2,980			47	16,148
Tumors, Carcinomata, Sarcomata, etc.....	101	44,570	2	120	9	401	1	224			113	45,315
Totals.....	1,330	591,005	2,324	108,514	2,401	112,821	585	79,028	6	156	6,646	891,524

CONDEMNATION SUMMARY

There were 2,630,791 pounds of meat and products condemned as unfit for food under state inspection. This included 6,646 entire carcasses and 230,497 parts condemned on antemortem and postmortem inspection and 210,131 pounds of processed products. Under state approved municipal inspection 39,813 pounds of processed products were condemned.

Of the 442 cattle carcasses retained for infestation with *cysticercus bovis* (measles), 441 were passed for food after removal of the parasite, 184 of them after freezing; one carcass was condemned. This is a decrease of 38 percent from the number of carcasses found similarly infested the previous year. Because this parasite is the intermediate stage of a human tapeworm, it is of considerable public health significance.

Condemnation of cattle livers for flukes and abscesses continued high. During the year 66,417 livers were condemned for flukes, 41,055 for abscesses. The economic importance of this loss can be appreciated when it is realized that the livers condemned for these two conditions alone amounted to approximately 25 percent of all the cattle livers inspected under state meat inspection.

Number of animals slaughtered at federal and state establishments in 1954, number of whole carcasses condemned and estimated number of animals slaughtered in uninspected establishments and on farms, and estimated total number of animals slaughtered:

Species	State inspection		Federal inspection		Total	
	Inspected	Condemned	Inspected	Condemned	Inspected	Condemned
Cattle -----	434,447	1,387	1,858,745	4,680	2,293,192	6,067
Calves -----	288,606	2,459	390,274	3,578	678,880	6,037
Sheep -----	399,623	2,430	1,774,860	9,840	2,174,483	12,270
Swine -----	224,548	599	1,613,446	4,711	1,837,994	5,310
Goats -----	2,439	7	58	5	2,497	12
Horses -----	-	-	41,416	66	41,416	66
Total -----	1,349,663	6,882	5,678,799	22,880	7,028,462	29,762

ESTIMATED UNINSPECTED SLAUGHTER *

Cattle 29,000 Calves 49,000 Sheep 80,000 Swine 89,000 Total 247,000

* Estimated uninspected slaughter includes the following: animals slaughtered on farms; animals slaughtered in uninspected slaughtering establishments located in counties of less than 28,000 population, in which compulsory meat inspection is not operative, and establishments operating under inspection exemption in other counties.

BUREAU OF LIVESTOCK IDENTIFICATION

LOGAN D. MORTON, *Chief*

The livestock industry of California looks to the Bureau of Livestock Identification for protection against loss by theft or straying of cattle, horses, mules, burros and sheep. To this end the bureau records all cattle brands used in the State and publishes periodically a brand book which illustrates brand designs and lists the name and address of each registered brand owner. There are approximately 26,000 active brands at the present writing.

Six supervising hide and brand inspectors, 78 full-time inspectors and 22 part-time inspectors, located at strategic points throughout the State, make brand inspections on all cattle sold or transported and on all horses slaughtered. If an inspector has reason to believe any animal offered for sale or transportation is not in possession of its rightful owner, the animal is seized and an investigation made to determine the true owner. If, after investigation, the owner cannot be found, the seized animal is sold at public auction. Any proceeds derived from such sale are held for a period of one year. Upon proper proof of ownership, the proceeds from the sale are released to the owner.

Bureau personnel work closely with local county and state law enforcement officials on cases involving lost, strayed or stolen animals. Livestock which have strayed, valued at thousands of dollars, are returned to their owners each year through the services of this bureau.

During the 1954 calendar year two important regulations were issued by the bureau. The first requires an imprint of each iron before the registration certificate is issued; also required is the filing of an imprint of all existing brands before January 1, 1959. The second regulation permits use of cattle record numbers in connection with and immediately below a registered holding iron. No special permit is necessary under these circumstances for the use of cattle record numbers.

In the early part of the year, the chief of the bureau continued with an investigation of the drought situation in San Bernardino County, by request of and in cooperation with the United States Department of Agriculture. He also conferred with the United States Border Patrol at San Ysidro and Calexico regarding Mexican horses which were straying across the International border into the United States.

The bureau chief attended the National Brand Conference, held in Clovis, New Mexico, which was attended by brand officials representing public agencies throughout the United States and Canada. He also attended the executive committee meeting of the National Brand Conference, held in Colorado Springs, to discuss amendments to the Packers and Stockyards Act.

The bureau chief and assistant chief took part in 11 district cattlemen's association meetings, attended by approximately 2,000 cattlemen.

In addition, the chief attended three peace officers meetings, the district meeting and the state convention of the California Wool Growers Association, the Western States Meat Packers Association and the Meat Marketing Conference held at Davis. He made two television appearances, discussing the necessity of registering brands and the procedure to be followed.

Members of the bureau staff have been working in cooperation with agents of the Federal Bureau of Investigation on interstate movement of stolen cattle.

The program of setting up road blocks, in cooperation with the county sheriffs offices and the State Fish and Game offices, was continued during the year.

Following is a statistical summary of the 1954 activities.

Inspections	
Cattle and horses	4,870,269
Brand recordings:	
Cattle and horses	2,383
Brands reinstated and renewed:	
Cattle and horses	22,514
Brands transferred:	
Cattle	390



Illustrated above, branding of calves with a brand other than that of the owner. Shown here, a calf belonging to a 4-U-F (connected) cow, was branded with a "JD" brand. Brand inspectors checked these cattle and filed a complaint against the owner of the "JD" brand. Because intent to steal the calves could not be proved, no conviction was obtained. The calves were returned to their legal owners.

Duplicate brand certificates issued:

Cattle	12
Licenses issued:	
Cattle slaughterers	189
Horse slaughterers	14
Public cattle sales yard	59
Horse transporters	12
Total licenses issued	274

Estrays:

Estrays reported:

Cattle	1,409
Horses	17
Hogs	126
Sheep	76
Miscellaneous	73

Estray cases opened:

Cattle	281
Horses	70
Miscellaneous	14

Estrays returned to owners:

	No.	Value
Cattle	1,012	\$124,971.13
Horses	83	4,052.67
Miscellaneous	6	18.49

Estray cases closed:

Cattle	350	9,634.94
Horses	52	837.24
Sheep	8	27.93
Miscellaneous	20	201.30

Enforcement activities—violations reported and warnings given:

No consignment papers	83
No certificate of consignment	4
No inspection prior to transportation	48
No inspection prior to slaughter	3
No bill of sale	4
Improper bill of sale	3
Slaughtering without proper license	13
Improper branding	26
Conducting sales without proper license	4
Transporting horses without proper license	1
Livestock straying onto highway	2
Producer of cattle acting as dealer	1
No record kept of cattle slaughtered	2
In possession of unidentified hides	1
Substitution in shipment of inspected cattle	2

Complaints filed:

Grand theft cases:

Thefts	28
Cases pending	6
Convictions	12
Cases dismissed	10

Petty theft cases:

Thefts	5
Convictions	3

Misdemeanor cases:

No inspection prior to transportation	9
No inspection prior to slaughter	5
No bill of sale	7
Use of unrecorded brand	1
Improper branding	7
No evidence to right of slaughter beef	1
Slaughtering without proper license	3
Producer of cattle acting as dealer	1
Convictions	31

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The following counties have no agricultural commissioner:

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